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3 September, 1952 No. 9

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY is a monthly publication devoted to:

A. Current Abstracts in English on important meteorological literature in every language.

B. Bibliographic references to other items of interest to the profession.

C. Selective, annotated bibliographies on subjects of immediate and special interest to meteorologists.

SUBSCRIPTION RATE: $6.00 per year to members and non members. Single and back issues $2.00. Back volumes, $10 per volume.

This publication has been made possible through support and sponsorship extended by the Geophysics Research Directorate of the Air Force Cambridge Research Center, Air Research and Development Command under Contract No. A. F. 19 (604)-302.

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 3 SEPTEMBER 1952 No. 9

SPECIAL FEATURE IN THIS ISSUE

A Selective Annotated Bibliography on Visibility

(*For complete table of contents see back cover*)

Published monthly at Prince and Lemon Streets, Lancaster, Pa., by the AMERICAN METEOROLOGICAL SOCIETY, 3 Joy Street, Boston 8, Mass.

Printed and issued by: Lancaster Press, Inc.

FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains from 175 to 300 abstracts of current periodical literature and monographs in the fields of meteorology, hydrology, oceanography, etc. These abstracts are arranged according to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of from 50 to 250 important references on a special subject without respect to recency of material. No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject. Preference is given to recent material, comprehensive works, material from obscure sources, and items with good bibliographies.

Bibliographies previously published were:

No.	Mo.	Vol. I, 1950	Vol. II, 1951
1.	Jan.	**Atmospheric Pollution**	**Extended Forecasting**
2.	Feb.	**Aerobiology**	**Long Range Forecasting**
3.	March	**Cloud Physics and "Rain Making"**	**Soil Temperature**
4.	April	**Hail**	**Constants, Units, Tables and Diagrams**
5.	May	**Tornadoes**	**Climate of the Near East**
6.	June	**Volcanic Dust**	**Climate of the Middle East**
7.	July	**Climatic Changes**	**Special Winds**
8.	Aug.	**Thunderstorms**	**Radar Storm Detection**
9.	Sept.	**Icing**	**Condensation Trails**
10.	Oct.	**Acoustical Propagation**	**Climate of Northeast Africa**
11.	Nov.	**Evaporation**	**Mountain Meteorology**

Bibliographies published this year were:

1. **Climatology of Northwest Africa,** Vol. III, No. 1, Jan. 1952
2. **Carbon Dioxide,** Vol. III, No. 2, Feb. 1952
3. **Climate of Paraguay, Uruguay and Argentina,** Vol. III, No. 3, March 1952
4. **Dew,** Vol. III, No. 4, April 1952
5. **Objective Forecasting,** Vol. III, No. 5, May 1952
6. **Stratus Forecasting,** Vol. III, No. 6, June 1952
7. **Urban Climatology,** Vol. III, No. 7, July 1952
8. **Climate of Central and West Africa,** Vol. III, No. 8, Aug. 1952
9. **Visibility,** Vol. III, No. 9, Sept. 1952

Forthcoming bibliographies will be:

10. **Glaze and Rime,** Vol. III, No. 10, Oct. 1952
11. **Free Air Turbulence,** Vol. III, No. 11, Nov. 1952

Other bibliographies in preparation are:

Actinometers
Arctic Meteorology
Auroral Physics
Climate and Cancer
Climate of Australasia
Climate of Southeast Asia and the East Indies
Frost and Frost Forecasting
High Level Winds
Machine Methods in Meteorology
Microwave Propagation
Oceanographic Meteorology
Ozone
Tropical Cyclones
Tropopause Variations
Turbulence

Part III contains a listing of the contents of those journals which are primarily meteorological. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. In the June and December issues cumulative indexes are published.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory (and American Meteorological Society) Library, Milton, Mass.
NN:	New York Public Library, New York, N. Y.
NNA:	American Geographical Society Library, New York, N. Y.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts.

Geographic locations are in the English form rather than the form used locally, for example, Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5–6):146–151, May–June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vol. 2), *Heft* 5–6 (No. 5 and 6), *pages* 146–151, May–June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

COMPENDIUM ARTICLES AND WORKS OF SPECIAL INTEREST

3.9–1 551.5(02)

Averkiev, M. S., **Meteorologiia.** [Meteorology.] Moscow, Izdat. Moskovskogo Universiteta, **1951.** 384 p. 266 figs., 73 tables, 19 refs., equations. **DLC**—Not since BYERS' famous textbook appeared in 1944 has there been published a more readable yet technically accurate and systematic college text in meteorology. Never has there been so theoretical a text published expressly for students of geography. As a result, the climatological works of geographers in the U.S.S.R. should become more and more satisfactory from the standpoint of a synoptic or dynamic meteorologist. This book covers in detail in the separate chapters of Pt. I: 1) atmospheric structure, 2) pressure, density, 3) radiation, 4) soil and water temperature, 5) heat transfer and temperature in surface layers of the atmosphere, 6) thermodynamics of the atmosphere, 7) lapse rates, inversions, air masses, 8) evaporation and humidity, 9) condensation processes, 10) precipitation and snow cover, 11) kinematics and dynamics of wind, 12) special winds, 13) cyclogenesis, fronts and anticyclones, 14) general circulation, 15) local storms and weather. Pt. II is on Instruments and Methods of Observation of: 16) pressure, 17) temperature of soil, air and water, 18) radiation, 19) evaporation and soil moisture, 20) clouds, fog, visibility and turbidity, 21) precipitation and snow cover and, finally, 22) wind. Most of the equipment and instruments now used in Russia are illustrated and records shown. Schematic diagrams are scattered profusely throughout the theoretical sections (based on latest models of circulation, cyclones, fronts, etc.). The section on radiation is especially complete, covering spectral distribution of solar radiation, absorption, scattering, insolation at the earth's surface; observations of direct and scattered radiation, albedo, long wave radiation from the earth and its absorption in the atmosphere and, finally, the radiative balance of the earth and atmosphere. The hydrologic cycle and micrometeorology as well as macrometeorology or mesoclimatology are also treated. Actual values are given in tables for most meteorological elements and parameters, and many formulas are presented in both mathematical and graphic form. In all, there are 184 separate sections in the 22 respective chapters. *Subject Headings:* **1. Meteorology 2. Textbooks 3. Teaching of geography.**—*M.R.*

3.9–2 551.584:551.521.4:001

Bolz, H. M. (*Univ. Rostock, Germany*), **Der Einfluss der infraroten Strahlung auf das Mikroklima.** [Influence of infrared radiation on microclimate.] *Germany. Deutsche Demokratische Republik. Meteorologischer Dienst, Abhandlungen*, No. 7, **1951.** 59 p. 29 figs., 52 refs. Price: 11.50 D.M. **DWB**—A comprehensive theoretical and experimental investigation of the dependence of the microclimates of basins and clearings upon the nocturnal long wave radiation balance. The theoretical part contains an analysis of: 1) the heat economy of a bare surface with special reference to the role of turbulent exchange in night frost occurrence; 2) the heat economy of a surface with plant cover; in this case the heat balance equation contains a term for the energy exchange in plants, and 3) the heat exchange of surfaces such as basins, furrows and clearings which do not exchange radiation freely with the sky. A graphical method for calculating the counter radiation from the sky is presented. The construction and application of an apparatus for measuring temperature, radiation, turbulence and heat exchange are described with the aid of photographs and diagrams. It was found that low temperature of the microclimate is occasionally produced by the advection of cold air but usually is the result of weak microturbulence, a small amount of heat supplied by the soil and a short duration of sunshine. The role of microturbulence and out radiation is analyzed. An appendix giving a precise definition of the terms used in radiation and the dimensions of the constants is included. *Subject Headings:* **1. Microclimates 2. Heat exchange 3. Radiation balance 4. Nocturnal radiation 5. Definitions.**—*I.L.D.*

3.9–3 551.583

Brooks, Charles E. P., **Geological and historical aspects of climatic change.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 1004–1018. 4 figs., 4 tables, 36 refs.) **MH-BH**—The following review of geological and historical climatic changes covers the following aspects: the world climates that prevailed during most of geological time (Jurassic, Eocene climates); the extent of and temperatures during the Quaternary Ice Age, and the pluvial periods during this Ice Age; the earlier ice ages, namely, during the Palaeozoic and Proterozoic Ice Ages; post-glacial climatic changes; the climatic changes during the Christian era; and the various theories of climatic changes which depend upon 1) variations of solar radiation, 2) changes in obliquity and eccentricity of the earth's orbit, 3) tidal variations, 4) continental drift, 5) variations in carbon dioxide 6) volcanic dust in the atmosphere, 7) topographic variations, 8) geographical factors and 9) a combination of changes in solar radiation and topography. *Subject Headings:* **1. Climatic changes 2. Historical climates 3. Quaternary climates.**—*I.L.D.*

3.9–4 551.586:612

Buettner, Konrad J. K., **Physical aspects of human bioclimatology.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 1112–1125. 2 figs., 4 tables, 84 refs., 20 equations.) **MH-BH**—An analysis of the application of physical principles to describe the heat balance of the human body is presented. Equations for calculating heat transfer by convection (in turbulent and laminar flow), by evaporation and by radiation; for calculating the total heat balance; for expressing the relationship between sultriness and heat and for calculating the equivalent temperature of rooms; the mathematical expressions (température résultante, cooling power, standard operative temperature, cooling temperature) describing the cooling power of the atmosphere; and equations for calculating the effect of clothing upon thermal balance and for calculating heat loss through breathing are given. Special consideration is given to the equations of heat balance developed by the author himself. Present knowledge on the effect of solar radiation upon the human body, on the physiological effect of periodic and aperiodic weather processes, on the special effects of the environment above the lower stratosphere and that encountered in flights along trajectories equal to that of celestial bodies upon the human body and the effect of extreme heat and cold are discussed. *Subject Heading:* **1. Physiological climatology.**—*I.L.D.*

3.9–5 551.584(09)

Geiger, Rudolf, **Microclimatology.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 993–1003. 3 tables, 35 refs.) **MH-BH**—In this review of the work carried on in the field of microclimatology and the present state of knowledge of this subject, the following topics are covered: the origin and history of research in microclimatology; the temperature, radiation, moisture and wind conditions in the layer near the ground; effect of type of ground surface and of soil upon temperature and moisture; methods for measuring temperature adjacent to ground; climate within the soil; eddy diffusion and austausch coefficient; contour climate including dependent and independent microclimates; microclimates in vegetation; the application of microclimatological techniques to agriculture as in wind, rain, frost protection, etc; microclimates of dwellings and the effect of structures upon microclimates of cities; and methodological problems in microclimatological studies, such as station density and instrumentation. *Subject Headings:* **1. History of microclimatology 2. Microclimatological research 3. Microclimates.**—*I.L.D.*

3.9–6 551.5(02)

Hann, Julius von (*1839–1921*), **Hann-Süring Lehrbuch der Meteorologie.** [Textbook of meteorology.] 5th ed. completely rev. Leipzig, W. Keller, **1939–1951.** 2 v. 1092 p. numerous figs., tables, refs. and equations. (1st Lieferung, 1937; 11th and final Lieferung, 1951.) **DLC**—It has been over 50 years since the first edition of HANN's famous "Lehrbuch" was published (1901) and 15 years since this monumental revision began to appear (1937). Unfortunately the war intervened, so the "completely revised and enlarged" chapters in the first volume were somewhat out of date before the last volume was completed. PROF. SÜRING was able, during his lifetime, to guide the revision throughout its course so that in spite of the

time involved (14 years) and the number of authors who participated in the revision, the work has an obvious unity. Furthermore, in spite of the great enlargement over the 4th edition (more than 200 pages added), and the necessary revision in a science which is developing so fast, the work can still honestly bear the name of HANN (or HANN-SÜRING as most users call it). The 11 "Lieferung" comprise 9 major parts (Teil). Pts. I to V comprise the first "Band" (volume) and contain a separate index, and parts VI to IX comprise a second "Band" (also indexed). Pt. I, containing 5 chapters on the **Atmosphere and Ionosphere** (origin, structure and extent), was revised by P. GÖTZ (*Arosa, Switzerland*); Pt. II, 2 chapters on **Radiation** (solar, sky and terrestrial) by R. SÜRING; Pt. III, 5 chapters on **Temperature** (horizontal and vertical distribution in troposphere and stratosphere) revised by R. SÜRING. Pt. IV, 4 chapters on **Pressure** (distribution, horizontally and vertically, and oscillations) by R. SÜRING and J. BARTELS; Pt. V, 5 chapters on **Humidity, clouds and precipitation** by M. ROBITZSCH, H. G. MÜLLER and SÜRING; Pt. VI, **Air Movements** (F. MÜLLER and M. ROBITZSCH); Pt. VII, **Weather** (R. MÜGGE, R. SHERHAG and SÜRING); Pt. VIII, **Grosswetter phenomena** (F. BAUR) and Pt. XI, **Electric phenomena in the atmosphere** (R. SÜRING and J. GOLDSCHMIDT). The chief value of the "Hann-Süring Lebrbuch" is not its usefulness as a textbook, but as a handbook because of its thousands of references, citations and illustrative tables of data (organized in a logical and easily usable manner) which exhaustively treat of every theoretical and practical phase of meteorology, current at the beginning and the Second World War. For instance, if one wishes to find the best estimate of the total weight of the atmosphere over a hemisphere or over the entire earth or to trace the history and development of charts of mean pressure, one easily finds the answer here and the treatment is so thorough as to leave nothing to be desired. This cannot be said of SHAW's "Manual." A few of the most recent developments such as cloud seeding with dry ice or silver iodide, or the use of V-2 rockets in exploring the upper stratosphere are too new to have been included. Advances have also been made in the study of the ionosphere, auroras and radiation measurement since those chapters were written. But for a useful and encyclopedic work on meteorology, this edition will stand for many years. *Subject Headings:* **1. Meteorology 2. Textbooks 3. Handbooks.**—*M.R.*

3.9–7 551.501.1:551.508:551.501.9(02)

†Haynes, Benarthur C., **Techniques of observing the weather.** New York, John Wiley and Sons, Inc., **1950.** 272 p. forms, illus., tables, refs., biblio. **DWB**—This is merely a reprinting of the first edition which came out originally in 1947. The following subjects are treated in a concise and lucid manner, aimed at the potential or actual observer, but not the trained meteorologist: the atmosphere, the weather observatory, clouds, visibility, hydrometeors, temperature, humidity, wind, pressure, precipitation, winds aloft, automatic weather stations, radar storm detection and an appendix containing an extensive bibliography and conversion tables, work sheets, etc. for practical use in observation. An especially large number of photos and diagrams of instruments, cloud photographs, nomograms, observational instructions and sample forms are included. The last chapter tells how to set up an inexpensive or improvised weather station, with many drawings of different types of instrument shelter, rain gage, anemometer, wind vane, hair hygrometer, aneroid barometer, and thermometer (bi-metallic), and concise instructions for operation and observation, etc. *Subject Headings:* **1. Observation techniques 2. Meteorological instruments 3. Amateur weather stations 4. Instrument exposure 5. Textbooks.**—*M.R.*

3.9–8 551.515.4:551.594.21(08)

†Israël, Hans and others, **Das Gewitter; Ergebnisse und Probleme der modernen Gewitterforschung.** [The thunderstorm; results and problems of modern thunderstorm research.] *Probleme der kosmischen Physik*, Vol. 25, **1950.** 249 p. photos., diagrs., graphs, bibliographies. Introduction in German, French and English. **MH-BH**—A series of articles by noted German meteorologists, providing a comprehensive compilation of knowledge about the meteorology of thunderstorms, theories on the origin of thunderstorm electricity, radioelectric disturbances caused by lightning or charges in clouds, and various other phases of thunderstorm activity (geographical frequency, relation to solar activity, synoptic aspects, cloud physics, etc.). The separate articles are by: R. MÜGGE, H. SIEDENTOPF, O. DINKELACKER, H. WICHMANN, F. ROSSMAN, E. WALL, H.-W. KASEMIR, H. MEINHOLD, E. HUSS, H. FLOHN,

H. Israël, H. Weichmann, and J. Küttner. A substantial section of this compendium is devoted to a discussion of the Thunderstorm Project in the U.S.A. and the results thereof, by J. Küttner; two reviews by Israël and Möller of notable works on the subject such as those by Beers, Louis P. Harrison, T. E. Allibone, G. D. Robinson, J. F. Shipley, F. E. Lutkin, G. C. Simpson, Whipple and Chalmers, Ross Gunn, Jean Bricard, K. B. McEachron, and C. Kramer, and a 22-page bibliography of 431 references arranged chronologically for the years 1939–1949. *Subject Headings:* **1. Thunderstorms 2. Thunderstorm electricity 3. Collected works 4. Bibliographies.**—*M.R.*

3.9–9 551.510.42:57

Jacobs, Woodrow C., **Aerobiology.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 1103–1111. 40 refs.) **MH-BH**—This comprehensive and critical review of aerobiology covers the following aspects of the subject: 1) methods of sampling and counting the various types of viable organisms in a given air volume namely, the "gravity slide," the plate method, etc., and needed improvements in techniques for obtaining greater accuracy; 2) techniques and problems of identifying organisms and locating their points of origin; 3) the effect of the environment, namely, temperature, solar radiation, humidity, etc. upon the viability and frequency of the organisms; and 4) the meteorological factors influencing the mechanics of exchange of organisms between the earth and atmosphere, and the role of turbulence, convection, air masses and stream flow upon the vertical and horizontal transport of organisms. *Subject Headings:* **1. Aerobiology 2. Microorganisms 3. Observation techniques 4. Meteorological elements.**—*I.L.D.*

3.9–10 551.58:6

Landsberg, Helmut E. and Jacobs, Woodrow C., **Applied climatology.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 976–992. 8 tables, 8 refs.) **MH-BH**—A comprehensive review of the problems and techniques of applied climatology and of the nature of the available and required data of applied climatology. The specific climatic data needed for various activities, the extent of available climatic data and data sources, required additional climatic data, the problem of interpolation of data, of substitution of climatic elements and of reduction of series, etc. are discussed critically. The various types of problems with which applied climatology is concerned, namely: 1) designs and specifications, 2) location and operation of facilities or equipment, 3) planning of operations and 4) the relations between climate and biological processes are described. A detailed discussion of the techniques of applied climatology is presented. These techniques which involve various combinations of climate, space and time are classified in the following groups: 1) single point - simple time series - single climatic element (insurance against rain, hail, etc.); 2) single point - single time series—multiple climatic element (design and specification for protection against the environment); 3) single point - complex time relation - single climatic factor (intensity-duration problems such as solar radiation as related to design of windows, etc.: probability of frost damage, etc.); 4) single point - complex time relation - multiple climatic element (deterioration of materials); 5) multiple point or areal problems - simple time series - single climatic element (marketing of "weather goods" on a national basis, etc.); 6) multiple point or areal problem - simple time series - multiple climatic element (planning for areal mapping of large areas) and 7) multiple point or areal problems - complex time series - multiple climatic element (agricultural land use in relation to climate.) (*Same as MAB* 3G–249, July 1952.) *Subject Heading:* **1. Applied climatology.**—*I.L.D.*

3.9–11 551.586:581

Lundegårdh, Henrik Gunnar, **Klima und Boden in ihrer Wirkung auf das Pflanzenleben.** [Climate and ground in their effect on plant life.] 3rd ed. Jena, Gustav Fischer, **1949.** 484 p. 127 figs., 46 tables, numerous refs. 2 fold. charts. **DLC**—This comprehensive book covers the climatic geography of plants in great detail. After a historical introduction, Chap. 2 deals with the light from sun and sky, its measurement, effects on growth, pigmentation and assimilation of CO_2 and its regional distribution. Sections include needs of light, importance of length of day, light in forests, meadows, soil and water. Chap. 3, the temperature factor, discusses physiological effects, death from and resistance to cold and heat, exposition, soil

temperature, periodic temperature variations as an ecologic factor, and temperature as a factor in plant geography. Chap. 4, the water factor, includes the physiologic effects of soil moisture, water balance, transpiration etc., plant modifications to fit variations of water supply, xerophotism and the effect of wind, and the water factor in plant geography. The remaining chapters deal with soil formation and type, physical structure and aeration of soils, chemical factors, microorganisms, the effect of CO_2 and, finally, the leading principles in experimental ecology and plant assemblies. There are complete author, subject and plant indexes and folding world maps of mean annual precipitation and the most important vegetation types. (*Same as* MAB No. 2C–63, March 1951.) *Subject Headings:* **1. Bioclimatology 2. Phytogeography 3. Plant ecology.**—*C.E.P.B.*

3.9–12 551.5(02)

Marshak, Ill'ia IAkovlevich (Il'in, Mikhail, *pseud.*), **Chelovek i stikhiia.** [Man and the elements.] 2nd ed. Leningrad, Gidromet. Izdat., **1948.** 255 p. numerous figs. **DLC**—An exceedingly interesting popular presentation of the entire field of meteorology and hydrology for the layman or high school student. Although the style is imaginative and literary (like SHAW's and HUMPHREYS'), the author has a sound basis of scientific and technical knowledge which appears in every paragraph. The illustrations, though poorly reproduced, are valuable in appreciating the work. [In the Bulgarian translation (*see* MAB 3.4–14, 15 and 43, April 1951) the illustrative material was omitted.] The network of observing stations, methods of observation, forecasting, service to the public, applications in war and peace, agriculture, conservation, industry, etc. are cited. Mention is made of the actual use of machine methods (punched cards) in the archives of the G.G.O. in Moscow, where 5 million cards are in use for climatological purposes and 3 million observations from 3000 stations a year are punched and where a series of machines are used daily in analog selection for synoptic forecasting. This work was under the direction of PROF. OMSHANSKIĬ (d. 1944). It was also mentioned that "it is very difficult to artificially extract rain from clouds" but hope was expressed that man could change nature by use of atomic energy. Great emphasis is placed on flood forecasting and storm warnings. *Subject Headings:* **1. Elementary meteorology 2. Hydrology 3. Textbooks 4. Punched card programs.**—*M.R.*

3.9–13 551.511:551.509.312

§Phillips, Norman A., **A simple three-dimensional model for the study of large-scale extratropical flow patterns.** *Journal of Meteorology*, 8(6):381–394, Dec. **1951.** 17 figs., 29 equations. 20 refs. Also: Chicago. University. Dept. of Meteorology, Contract N6ori-20, T.O. II, Technical Report, Aug. **1951. MH-BH**—A study of the hydrostatic motion of two layers of incompressible fluid of different densities subject to small perturbations on a zonal current, treated by methods similar to those of CHARNEY, and giving a measure of the vertical distribution of horizontal velocity divergence. If the initial flow patterns are determined from tropopause flow patterns, the development of the latter can be forecast. This is tested by calculating sea level tendencies and field of vertical motion (compared with cloud and precipitation) for the great storm of 24–25 Nov., 1950 over the northeastern U. S. with some success. Sources of error are discussed. *Subject Headings:* **1. Dynamics of the atmosphere 2. Mathematical forecasting 3. Northeastern United States. I. Chicago. University. Dept. of Meteorology II. Contract N6ori-20, T.O. II.**—*C.E.P.B.*

3.9–14 551.525.4:016 551.578.4:016 551.588.5:016

†U. S. Snow, Ice and Permafrost Research Establishment, **Annotated bibliography on snow, ice and permafrost.** *U. S. Snow, Ice and Permafrost Research Establishment, SIPRE Report* 12, Sept. **1951.** 226 p. **DLC**—The bibliography consists of three sections: Section I is a reproduction of the first 780 abstracts prepared by the Science Division of the Library of Congress. These abstracts are informative, all items have been found and checked and subject catalog is included for all entries. Section II consists of the Purdue University bibliography on snow, ice and permafrost. Pt. A contains annotated references and Pt. B unannotated references. Section III contains abstracts prepared at the University of Minnesota, without change. The Purdue and Minnesota bibliographies will eventually be abstracted and included in the regular *SIPRE* bibliography. *Subject Headings:* **1. Bibliographies 2. Snow, ice and permafrost**

bibliographies 3. Abstracts. I. U. S. Library of Congress II. Minnesota. University III. Purdue University IV. Yerg, Donald V. G. V. Gray, Dwight, E.—*M.R.*

3.9–15 551.5:06

†World Meteorological Organization, **WMO Bulletin.** v. 1. no. 1, April **1952.** first issue. 24 p. **DWB**—A small and attractive bulletin designed to provide information on activities of the WMO and its member commissions, developments in international meteorology and applications of meteorology to human activities. It is not intended as an outlet for scientific papers but for reports of interest to members of WMO. The first of these quarterly bulletins contains a picture of the new WMO Headquarters in Geneva, a map of Geneva showing its location with respect to other international institutions, a history of the IMO and its change to WMO after the convention was signed in Washington in 1947 (effective March 23, 1950) and its relation to UN, UNESCO, ITU, ICAO, WHO, IUGG, IATA. A list of members of Executive Committee, Regional Commissions and officers and Technical Commissions and their officers, and a picture of those attending the first Congress (Paris 1951) are given. Activities of each Regional and Technical Commission, and activities in various countries under point 4 and UNESCO programs are described. A list of WMO and IMO publications is appended. The bulletin is published in 2 editions, English and French. *Subject Headings:* **1. World Meteorological Organization 2. Meteorological bulletins 3. Periodicals. I. Swoboda, G.**—*M.R.*

GENERAL METEOROLOGY

(*See also items:* 3.9–1, –6, –12, –15)

3.9–16 551.5:001.4:484

Stenz, Edward, **W sprawie terminologii meteorologicznej.** [On meteorological terminology.] *Gazeta Obserwatora PIHM*, 3(9):13–14, Sept. **1950. DLC**—Considers misused Polish terminology for subjects such as wet bulb, drizzle, rime, and frigorograph. Bases criticism on the development and usage of the Polish language. *Subject Headings:* **1. Terminology 2. Polish language.**—*W.T.*

3.9–17 551.5:06(43)

Baden. Landeswetterdienst, **Jahresbericht des Badischen Landeswetterdienstes für 1950.** [Annual report of the Baden Weather Service for 1950.] *Baden. Landeswetterdienst, Jahresbericht mit Abhandlungen*, **1950.** p. 4–10. **DWB**—A description of the organization of the weather service, a list of stations with coordinates and of observers. A description of the bioclimate institute (Bioklima-Institut) and of the research projects carried out under the auspices of the weather service and a list of publications by members of the staff. This annual survey of activities is a regular feature of the annual report. *Subject Headings:* **1. Meteorological services 2. Annual reports 3. Baden Weather Service 4. Baden, Germany.**—*I.L.D.*

3.9–18 551.5:06

Schumann, Theodor Eberhard Werner, **An International Meteorological Institute.** *Weather*, 7(4):99–106, April **1952.** 11 refs. **DWB**—Discussion of functions of proposed Institute as part of W.M.O., suggesting that it should be an information center for all meteorological observations, condensed and digested, and also carry on bibliographic work and prepare a climatic atlas. *Subject Heading:* **1. World Meteorological Organization.**—*C.E.P.B.*

3.9–19 551.5:06(47)

Tomfel'd, N. P., **Gidrometeorologicheskoe obsluzhivanie narodnogo khosiaĭstba.** [The Hydrometeorological Service in the service of national economy.] *Meteorologiia i Gidrologiia*, No. 2:16–19, Oct. **1950. DLC**—A review of problems of the forecasting service of the national economy (exclusive of agriculture). The author indicates the principal features of reports and forecasts, which are needed for the service of the Ministries of Water and Air Transport, Fishing, Railways, Electric Stations and Communications. Among the most important are:

the hydrologic characteristics of the river regime (heights of flood, runoff during flood period and later in summer season); forecasts of glazed frost, of storms, of snow storms, visibility, and of the heights and thickness of clouds. In conclusion, some benefits of the Weather Service during 1949–1950 for the lumbering and fishing industries are mentioned. *Subject Headings:* **1. Hydrometeorological services 2. Weather forecasting 3. Industrial meteorology 4. U.S.S.R.**—*N.T.Z.*

3.9–20 551.5:335(439.1)

Szirmai, Ervin, **Meteorológia és a politika.** [Meteorology and politics.] *Időjárás*, 54(7–8):193–196, July–Aug. **1950. MH-BH**—The author, chairman of the Disciplinary Committee at the Hungarian Meteorological Society, charges western countries with basic errors in their scientific concepts and claims that dialectic materialism alone provides a proper ground on which to base scientific development. Hungarian scientists are urged to adopt that doctrine, as Soviet scientists have done, and to lend active support to the Socialist movement in the interest of science and the preservation of peace. *Subject Headings:* **1. Meteorology 2. Politics 3. Hungary.**—*G.T.*

3.9–21 551.5:37:63

Noth, Hermann (*Friedrichshafen/Bodensee*), **Erfahrungen und Förderungen der Landwirtschaft in Württemberg-Hohenzollern bezüglich des agrameteorologischen Dienstes.** [Experience and requirements of agriculture in Wurtemberg-Hohenzollern in regard to the agrometeorological service.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 32:91–95, **1952. DWB**—The results of agrometeorological research cannot be applied if farmers are ignorant of meteorological problems. It is suggested that meteorology be taught in grammar schools. The need for a synoptic and climatological service for agricultural purposes is discussed. *Subject Headings:* **1. Teaching of meteorology 2. Agricultural meteorology.**—*A.A.*

3.9–22 551.5:518.3(03)

Adams, Douglas P. (*ed.*) (*M.I.T., Prof. of Graphics*), **An index of nomograms.** Technology Press of Massachusetts Institute of Technology, and John Wiley, **1950.** 174 p. Price $4.00. **DWB**—The first part includes an alphabetical list of key words which can be associated with a nomogram. The second index lists the name of the publication (full reference) where each nomogram can be located. Over 1700 published nomograms are listed. *Subject Headings:* **1. Nomogram index 2. Terminology.**—*W.S.*

3.9–23 551.5:72(54)

Raychaudhuri, B. C., **Comforts and buildings.** *Science and Culture*, Calcutta, 17(5):199–202, Nov. **1951.** 3 refs. **MH-BH** -In India the main consideration is to minimize penetration of solar heat into buildings by conduction through walls, absorption by walls and infiltration of air; methods of achieving this are insulated false ceilings, cavity bricks, whitewashing, projecting eaves, screens, etc. Climatic data required and desirable research in India are summarized. *Subject Headings:* **1. Building design 2. India.**—*C.E.P.B.*

3.9–24 551.5:91.04

Hamilton, R. A., **The British North Greenland expedition, 1952–54.** *Nature*, London, 169(4305):727–728, May 3, **1952.** Also: *Weather*, 7(8):250–252, **1952. DWB** –This large scale expedition will be stationed in Queen Louise Land, 77°N, 24°W, with an ice-cap station in 78°N, 40°W for meteorology, gravimetry, and glaciology. The work will include micrometeorology, ablation and accumulation, penetration of temperature waves into ice, and ionospheric research. *Subject Headings:* **1. Arctic expeditions 2. Greenland.**—*C.E.P.B.*

3.9–25 551.5:910:37

Hare, F. Kenneth, **Geographical aspects of meteorology.** (In: Taylor, T. G. (*ed.*), **Geography in the twentieth century.** New York, **1951.** p. 178–195. photo., charts, biblio.) **DWB**—The author maintains that the trained geographer proved as competent in wartime meteorological practice as the mathematical or physical meteorologist, although allowing

that some training in mathematics and physics is essential. The difference between the "old" and "new" or frontal school of meteorology is also said to be exaggerated, and progress since the First World War slow even in air mass meteorology. The basic concepts of the air mass and frontal meteorology and climatology, the three dimensional concept, radar storm detection, rain making, the hydrologic cycle, and the future of meteorology and climatology are discussed in several paragraphs and illustrated. *Subject Headings:* **1. Meteorology 2. Geography 3. Training in meteorology.**—*M.R.*

3.9–26 551.5:92

Hesse, Walter, **Max Robitzsch zum 65. Geburtstag.** [Max Robitzsch on his 65th birthday.] *Beiträge zur Geophysik*, 62(3):162–163, **1952.** photo. **DWB**—Born Feb. 2, 1887 in Höxter, Westphalia. Studied mathematics and natural science. Assistant at Physical Institute of Marburg 1909–14, Spitzbergen 1912–13, later at Lindenberg and from 1935 head of various sections of Reichsamt für Wetterdienst; Director 1942–48. Since 1950, Professor of Geophysics at Leipzig. Work mainly instrumental and aerological. *Subject Headings:* **1. Biography 2. Robitzsch, Max.**—*C.E.P.B.*

3.9–27 551.5:92

†Lautensach, Hermann, **Otto Jessen zum Gedächtnis.** [In memory of Otto Jessen.] *Petermanns Geographische Mitteilungen*, 96(1):1–6, **1952.** photo, 75 refs. **DLC**—O. Jessen, born 18 Feb. 1891 near mouth of Elbe, died 9 June 1951, was a geographer with special interest in morphology. His published works include some on effect of geological climates on land forms. *Subject Headings:* **1. Biography 2. Obituaries 3. Jessen, Otto.**

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

(*See also items:* 3.9–7, –49, –61, –93, –124)

3.9–28 551.501

U. S. Treaties, etc. 1945–, Truman, **Weather stations Pacific Ocean Program. Agreement between the United States of America and Canada, effected by an exchange of notes signed at Washington June 8 and 22, 1950, entered into force June 22, 1950.** U. S. Dept. of State. Publication 3963. Treaties and other International Acts Series, 2103. [**1950?**] 4 p. **DWB**—Coordinates of locations of stations constituting Pacific network of ocean stations that are to be established are given. *Subject Headings:* **1. Meteorological stations 2. Pacific Ocean.**—*I.L.D.*

3.9–29 551.501:06(73/9)

U. S. Weather Bureau, **Division conference report; Station Facilities and Meteorological Observations Division.** [June 1951.] 21 p. **DWB**—Contains a brief report on activities of the Division of the U. S. Weather Bureau which handles observational matters and the operation of stations and networks of special types, by the Chief of Division, R. H. Weightman. Four detailed special reports are also included: one by B. C. Haynes on the work of the Observations Section; T. S. Southwick on Station Operations; one by Louis P. Harrison on Technical Investigations, wherein a list of projects undertaken during 1950, and explanation of a new system of reducing pressures to sea level is included. *Subject Headings:* **1. Station operations 2. Meteorological research 3. Observation techniques 4. United States. I. Weightman, R. H. II. Haynes, B. C. III. Harrison, L. P. IV. Southwick, T. S.**—*M.R.*

3.9–30 551.501.4

Sieland, Karl, **Scherungswindnomogramm.** [Wind shear nomogram.] *Annalen der Meteorologie*, 4(7/9):399–402, **1951.** 8 figs. **DWB**—Author sets out principle of mean wind vector over a layer of air and illustrates a double circular transparent scale, with radial and concentric lines, which can rotate over a network of squares. The rapid method of finding the vector difference between winds at different levels with this cheap aid is described with

examples. *Subject Headings:* **1. Nomograms 2. Upper air wind computation 3. Vectors.**—*C.E.P.B.*

3.9–31 551.501.7

Dieterichs, Heinz, **Schablone zum Zeichnen der Isohypsenabstände.** [Form for calculating isohypse distances.] *Zeitschrift für Meteorologie*, 6(3):89, March **1952.** fig. **MH-BH**—Illustrates a scale to be engraved on perspex, pierced at intersection of lines, for calculating isohypses from upper winds. *Subject Heading:* **1. Upper air computation.**—*C.E.P.B.*

3.9–32 551.501.7

Grant, Donald, **The Meteorological Research Flight.** *Weather*, 7(3):92–93, March **1952. DWB**—Lecture on methods and results at Farnborough, England. *Subject Heading:* **1. Upper air research.**

3.9–33 551.501.81:551.510.5

Krassner, Martin, **The upper air challenge.** *U. S. Air Services*, Washington, D. C., 36(9):10, Sept. **1951. DLC**—Note on the activities of the 56th Strategic Reconnaissance Squadron, Air Weather Service, U. S. Air Force, flying WB-29s from a base in Japan. The operation of dropsondes is explained. The drops are made from an altitude of 18,000 feet and the sonde is claimed to transmit 12 code signal groups a minute while descending at a rate of about 1,100 feet per min. *Subject Headings:* **1. Dropsondes 2. Airplane weather reconnaissance 3. Upper air soundings.**—*G.T.*

3.9–34 551.501.9:551.582.2

*Milham, Willis Isbister, Cunningham, Frank E., Milett, Theodore and Trottier, Emile N., **Meteorology and meteorological observations in Williams College; also at the Hopkins Memorial Experimental Forest, and in North Adams.** Williamstown, Mass., McClelland Press [n.d.]. 40 p. figs., tables. Price: $1.00. **MH-BH**—Monthly and annual precipitation and mean temperature data from 1811 to 1948 (with some break in record) are presented, and a few analytical tables given to show extreme conditions, thunderstorms, snow, wind frequencies, frosts, cloudiness, etc. History of station, teaching of meteorology and important observers and instructors, included. *Subject Headings:* **1. Climatic data 2. Long period records 3. Teaching of meteorology 4. Williams College, Williamstown, Mass. 5. Hopkins Observatory, Mass. 6. North Adams, Mass.**—*M.R.*

OBSERVATIONAL DATA

(*See also items:* 3.9–51, –139, –215)

3.9–35 551.506.2:016

†Rothé, J. P., **Bibliographie des travaux français relatifs à l'Année Polaire, 1932–1933.** [Bibliography of French works relating to the Polar Year, 1932–1933.] *Strasbourg. Université. Institut de Physique du Globe, Annales, New Ser., Part 3: Géophysique.* v. 6:71–76, **1950. DWB**—The contents of the official publications on the Polar Year (in 3 volumes) are listed by author and title, and 74 separate articles cited in 3 groups: 1) articles by members of the French expeditions to Scoresby Sound and Tamanrasset; 2) other French publications relating to the Polar Year; 3) popular articles and works; 4) documents and manuscripts not published and 5) films. Many subjects are covered. *Subject Headings:* **1. International Polar Year, 1932–33 2. Bibliographies 3. French Polar Expedition.**—*M.R.*

3.9–36 551.506.3(99) 550.38

*Argentina. Servicio Meteorológico Nacional, **Datos climatológicos y geomagnéticos. Islas Orcadas del Sur. Período 1903–1950.** [Climatological and geomagnetic data. South Orkney Islands. Period 1903–1950.] *Argentina. Servicio Meteorológico Nacional, Ser. B.*, 1, Pt. 1, **1951.** 97 p. chiefly tables, graphs. **DWB**—A brief historical note on the observatory on Laurie Island is followed by a section devoted to climatological data and one to terrestrial magnetism data. Included in Pt. I are tables for the following: decadal and annual

moving averages of pressure and temperature, daily march of pressure, wind, temperature, etc.; average monthly, absolute minimum and maximum, and monthly amplitude of pressure and temperature; average daily pressure, temperature, cloudiness and precipitation; average monthly sea temperature; ice conditions in Scotch Bay and snow data. Pt. II contains extensive tables and graphs based on geomagnetic observations. Geographic coordinates of station are given. *Subject Headings:* **1. Climatic data 2. Terrestrial magnetic data 3. South Orkney Islands.**—*M.L.R.*

3.9–37 551.506.3:551.582.2(44)

*Chassany, J. Ph., **Resumé de 70 années d'observations météorologiques à Saint-Genis-Laval.** [Resumé of 70 years of meteorological observations at Saint-Genis-Laval.] *Lyons. Observatoire. Publications, Série II, Météorologie et Physique du Globe*, 1(7), [1951]. 49 p. all tables. **DWB**—Mean monthly and annual temperature, days with frost, extremes of temperature and frequency of warm days and nights, monthly and annual precipitation, snowfall, pressure, humidity, fog, cloudiness, hours of sunshine, days with exceptional visibility, evaporation, number of sunless days, etc. 1881–1950 for Saint-Genis-Laval which sits on a little ridge 9 km SW of Lyons, France. No local influences have changed the exposure in the 70 years of record. *Subject Headings:* **1. Climatic data 2. Long period records 3. Saint-Genis-Laval, France.**—*M.R.*

3.9–38 551.506.7

Operation Moby Dick. *Weatherwise*, 4(6):123, Dec. **1951.** photo. **DWB**—A brief description of U. S. Air Force project to fly a series of controlled balloons across the United States at elevations of 50,000 to 100,000 feet in order to investigate the stratospheric wind systems. *Subject Headings:* **1. Stratospheric research 2. Pilot balloons 3. Wind systems 4. United States.**—*I.L.D.*

3.9–39 551.506.8

Ewer, D. W., **Animal weather-prophets.** *Weather*, 7(1):16–19, Jan. **1952. DWB**—Account of behavior of animals and insects believed to presage weather, and some remarks on reliability or otherwise. *Subject Heading:* **1. Weather lore.**

3.9–40 551.506.8

Hawke, Eric Ludlow, **Indications of spring.** *Weather*, 6(9):287–288, Sept. **1951.** table. **DWB**—Comparison of phenological observations in 1951 near Norwich with long record at Marsham 1736–1945. *Subject Headings:* **1. Phenology 2. Long period records.**—*C.E.P.B.*

3.9–41 551.506.8:912

Mäde, Alfred, **Zur Methodik phänologischer Kartenentwürfe.** [On the technique of constructing phenological charts.] *Angewandte Meteorologie*, 1(5):139–142, May **1952.** 2 figs. **DWB**—The phenological network of observations is not yet sufficient by itself for detailed charts. Author shows how they can be improved by using also charts of soil type, illustrated by charts of Saxony-Anhalt for flowering of snowdrop and beginning of field work. *Subject Heading:* **1. Phenology.**—*C.E.P.B.*

3.9–42 551.506.8:581.543:598.2(438)

Riabinin, Sergiusz, **Z obserwacji nad fenologia ptaków.** [Observation on the phenology of birds.] *Gazeta Obserwatora PIHM*, Warsaw, 3(8): (inside front cover), Aug. **1950. DLC**—A collation of the time of arrival of some singing bird varieties with the development stages of plants in spring, based on personal observation of the author in the parks of Poznań, Poland is presented. *Subject Headings:* **1. Phenology 2. Bird migrations 3. Poznań, Poland.**—*A.M.P.*

3.9–43 551.506.8:581.543(47)(09)

Rudenko, A. I., **Sostoianie, znachenie i zadachi sovetskoĭ fenologii.** [The status, significance and tasks of Soviet phenology.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Izvestiia*, 83(2):141–151, March–April **1951. DLC**—The history of phenological observations

in Russia from the time of Peter the Great up until the present is surveyed. The author proposes the extension and systematization of phenological observations and their integration with agriculture, with fishing and hunting industries. *Subject Headings:* **1. History of phenology 2. Bioclimatology 3. U.S.S.R.**—*I.L.D.*

3.9–44 551.506.8:598.2:581.543

Rudkovskij, Boris, **O významu uceleného fenologického pozorování ptactva v přírodě.** [The importance of a comprehensive phenological study of birds in their natural surroundings.] *Meteorologické Zprávy*, 4(506):127–128, **1950.** In Czech. **MH-BH**—The author suggests that the time of arrival and departure of migrating birds, which is linked to meteorological factors, should be closely observed and that observers should be able to identify birds by sight and hearing and to pay attention to certain plants which develop at the same time as certain birds arrive. Editor Josef Brablec points out in a note that for Czechoslovakia, with its varied climatic conditions and topography, it is not possible to draw general conclusions from the behavior of birds and he mentions a few examples to prove discrepancies between the expected and actual arrival of certain species. *Subject Headings:* **1. Phenology 2. Bird migrations 3. Czechoslovakia.**—*G.T.*

INSTRUMENTS AND INSTRUMENT CARRIERS

(*See also items:* 3.9–7, –47, –146, –187, –189, –215)

3.9–45 551.507.351:551.558.21

Ivans, William S., Jr., **Eight miles high.** *Soaring*, Memphis, Tenn., 15(1):3–5, 12, Jan/Feb. **1951.** photo, 2 tables. **DLC, DWB**—A detailed account of a record sailplane ascent made by the author on Dec. 30, 1950, when he reached an indicated altitude of 42,000 ft near Bishop, Calif. A lenticular altocumulus cloud in the lee of Sierras gave the pilot indication of a powerful standing wave. Pilot balloon data to 30,000 ft indicated unusual direction shifts and a speed of 80 knots at 20–25 thousand ft. Turbulence increased as the plane gained altitude but never became dangerous. Just below an altocumulus cloud the turbulence was of peculiar nature similar to driving over a rough road at high speed. Maximum gusts were $+3\frac{1}{2}$ g. The top temperature was $-69°C$ and the lenticular cloud was still above the plane at the top of the flight. *Subject Headings:* **1. Gliding 2. Sierra wave 3. 3. Bishop, Calif.**—*M.R.*

3.9–46 551.507.351:551.510.53

Jarland, R. (*Chief Engr., Arsenal de L'Aeronautique, France*), **The stratospheric glider and scientific research.** Locust Valley, N. Y., Aerophysics Institute, Inc., **1948.** 12 p. diagrs., graphs. Translation of his article in French, from *Espace*, July **1947. DWB**—The use of the glider in France and Germany for military and civilian purposes, the advantages of a glider over power planes or balloons for research, records attained (12 km by Klockner in 1942 at a time when a lenticular cloud was at 14 km), and possibility of reaching 20 km during föhn conditions over Alps, and specific problems of research which could be solved are outlined briefly. Study of vertical motions, standing waves, atmospheric electricity, cloud physics, visibility in clouds, condensation trails, cosmic radiation, aerodynamics, etc. with hindrance of motor or metal are mentioned and some results obtained by gliders illustrated graphically. The stratosphere glider is described and detailed specifications given for a pressurized and heated plane which could carry the necessary instruments from 17 km down. Advantages of electrical and chemical heating are compared. *Subject Headings:* **1. Gliders 2. Upper atmosphere research. I. Aerophysics Institute, Inc.**—*M.R.*

3.9–47 551.507.352:551.508.26

Grant, D. R. and Clark, D. D., **Measurement of free air temperature from aircraft.** *Meteorological Magazine*, London, 81(958):113–116, April **1952. DWB**—Opener, D. R. Grant, described sources of error as due to position of thermometer, solar radiation, lag and heating due to speed of aircraft. He then described types of aircraft thermometer and some results

of British ultra-rapid instrument. D. D. CLARK described research in Instruments Division. *Subject Headings:* **1. Thermometers 2. Air-borne instruments.**—*C.E.P.B.*

3.9–48 551.507.352:550.38

Lundbak, Asger, **Aeromagnetic survey of vertical intensity over the Sound with apparatus of the BMZ type.** *Tellus*, 3(2):69–74, May 1951. 4 figs., 7 refs. **MH-BH**—An attempt was made to measure the vertical magnetic intensity over land and sea with a BMZ-type telescope suspended in an airplane. Flights were made on Feb. 22 and March 28, 1950 at 4000 m and at 500 m along a 40 km line from Copenhagen to Helsingör, Denmark. Accuracy of measurements and sources of error are discussed. *Subject Headings:* **1. Aerial reconnaissance 2. Vertical magnetic intensity 3. Denmark.**—*M.R.*

3.9–49 551.501(02):551.507.352

U. S. Air Weather Service, **AWS flight folders.** *U. S. Air Weather Service Manual* 55–5, Aug. 1, 1951. 15 p. forms, folded. **DWB**—An instruction manual for use in recording flight weather information on accordian folded cross section forms which are provided for use by Air Weather Service personnel. Cloud amount, type, thickness, ceiling, visibility, icing, fog, dust, temperatures, fronts and hydrometeors, can be plotted or tabulated on this form, along with other flight information. The form is to be field tested for one year. *Subject Headings:* **1. Airplane observations 2. Cross section charts 3. Observers manuals 4. Pilot reports.**—*M.R.*

3.9–50 551.507.362:551.510.535

Advance man to the moon. *Aero Digest*, New York, 63(4):25–32, Oct. 1951. 5 figs. **DWB, DLC**—Account of upper air soundings by Martin Viking rockets launched under cooperation of several agencies with headquarters at White Sands Proving Grounds. Seven firings are described, the last taking place on Aug. 7, 1951 when an altitude record of 135 miles was made General information is given on recording instruments carried by the rocket and on data obtained with them. Technical details of the rocket are explained and shown in pictures. *Subject Headings:* **1. Upper air soundings 2. Rocket instrumentation 3. Martin Viking rockets 4. White Sands, New Mexico.**—*G.T.*

3.9–51 551.507.362:551.506.7

Gatland, Kenneth W., **Evolution of the guided missile. Pt. I.** *Flight*, London, 59(2206):534–537, May 4, 1951. **Pt. II.** *Ibid.*, 59(2208):598–600, May 18, 1951. **Pt. III.** *Ibid.*, 59(2214):768–770, June 29, 1951. **Pt. IV.** *Ibid.*, 60(2216):45–48, July 13, 1951. **Pt. V.** *Ibid.*, 60(2218):113–116, July 27, 1951. **Pt. VI.** *Ibid.*, 60(2219):140–143, Aug. 3, 1951. 32 figs., 3 tables, 3 refs. **DLC**—In Pts. IV and V of this series, author deals with rockets as instrument carriers for high altitude research. Pt. IV gives a description and indicates results of rockets lately devised and launched, such as the WAC Corporal, the A-4(V-2) and the Viking. Comparative data for technical properties and accomplishment of Viking and A-4 are presented in a table and rockets are shown in photographs and drawings. In Pt. V, possibilities of space flight and of launching a close-orbit earth satellite vehicle are discussed and technical requirements of such a satellite listed in a table and explained by means of schematic drawings. *Subject Headings:* **1. High altitude research 2. Rocket observation.**—*G.T.*

3.9–52 551.508.29:551.463

Anderson, Ernest R. and Burke, Arthur T. (*U. S. Navy Electronics Lab., S. Diego, Calif.*), **Notes on the development of a thermistor temperature profile recorder (TPR).** *Journal of Marine Research*, 10(2):168–179, 1951. diagr., graphs, refs. **DWB**—A description of the design, construction, calibration and operation of a portable thermistor temperature profile recorder giving vertical temperature profiles up to a depth of 30 meters in bodies of water relatively undisturbed by wind waves and surface currents. The instrument consists of a hand-operated cable reel, an Esterline-Angus recorder and amplifier, and uses a thermistor as the temperature sensitive element. It provides a continuous record of temperature over five temperature ranges (0–50°C, 0–10°C, 9–19°C, 18–28°C, and 27–37°C) with a calibrated

accuracy of 0.5°C to 0.1°C. The response factor of the complete instrument is 1.4 seconds. Photographs of the instrument and schematic diagrams of the recorder and of method for measuring response factor are given. *Subject Headings:* **1. Thermistors 2. Temperature profile recorders 3. Water temperature profiles.**—*I.L.D.*

3.9–53 551.508.43

Sonntag, D., **Der Feindruckschreiber am Observatorium Collmberg.** [The microbarograph at Collmberg Observatory.] *Zeitschrift für Meteorologie*, 6(3):68–74, March **1952.** 5 figs., 3 tables. **MH-BH**—A scale of 0.5 cm to 0.1 mm Hg is obtained with two sets of 6 aneroid boxes, recording photographically by reflection from a mirror. Calibration is described and the mathematics of the instrument discussed. *Subject Heading:* **1. Microbarographs.**—*C.E.P.B.*

3.9–54 551.508.49

Mosetti, Ferruccio, **Teoria del microbarografo Alfani.** [Theory of the Alfani microbarograph.] *Annali di Geofisica*, 4(3):419–432, July **1951.** 4 figs., 4 graphs, 7 refs., 12 equations. **MH-BH**—Description of a microbarograph which will measure variations of the order of 10^{-4} mm of mercury with periods of a fraction of a second. The Schmidt (1912) and Benndorff-Zimmermann (1938) microbarographs are first described, and then the Alfani instrument, one type of which (with modification) has been used in America by MacElwane and Benioff, is described and illustrated and the theory developed. An appendix gives the theory and empirical curves governing laws of flow of a gas through a capillary. Records obtained during winds from different directions are presented, reminding one of pressure anemometer records during gusty weather. Calibration curves presented show effect of varying diameter of capillary on sensitivity of instrument. *Subject Heading:* **1. Microbarographs.**—*M.R.*

3.9–55 551.508.58

Fergusson, Sterling P., **Nephoscopes (I and II).** *American Meteorological Society, Bulletin*, 32(7):259–266, 308–313 Sept., Oct., **1951.** 16 figs., 53 refs. **DWB**—In Pt. I various types of nephoscopes for determining the position and motion of clouds are described, and theoretical as well as practical considerations are treated in detail. The first nephoscope was developed by Aime in 1845; the principles having been invented in 1842 by Wartmann and Bravais, and the name first applied by Braun in 1864. In 1888 Abbe wrote a classical treatise on meteorological instruments and methods, since which time no treatment of the nephoscope has appeared in the literature published in the U.S.A. In Pt. II types of instruments (theodolite nephoscopes, reflecting nephoscopes, etc.) and individual designs such as those of Besson (1896), Schlein (1915), Cecchi (1872), Fineman (1880), Clayton (1886), Marvin (1896), Thomas (1927), McAdie (1920), Fergusson (1919) and U. S. Weather Bureau (1919) are described and illustrated; installation and use also discussed. *Subject Headings:* **1. Nephoscopes 2. Cloud observation.**—*M.R.*

3.9–56 551.508.58

Vemić, M., **Jedan novi neformetar.** [A new nephoscope.] *Yugoslavia. Hidrometeorološka Sluzba. Hidrometeorološki Glasnik*, 2(1/2):27–43, **1949.** 6 figs., 2 graphs, 29 equations. In Serbian; Russian and French summaries, p. 39–43. **DWB**—Portability, simple operation and convenience are main advantages of the instrument, which is claimed to have an accuracy superior, for example, to that of Besson's nephoscope. The instrument is shown in a photo, its technical description given and its operation explained in detail. Equations are developed for calculating velocity and direction of the movement of clouds from nephoscope readings. The accuracy of the instrument is discussed with particular attention to the case in which clouds move in a nonhorizontal plane. *Subject Heading:* **1. Nephoscopes.** —*G.T.*

3.9–57 551.508.71

Commonly used hygrometers. U. S. Weather Bureau, Jan. **1946.** 3 leaves. Typewritten. **DWB**—Brief description of the principles and limitations of the hair hygrometer,

psychrometer, dew point apparatus, chemical hygrometer and electrical hygrometer. *Subject Headings:* **1. Hygrometers 2. Psychrometers.**

3.9–58 551.508.71

Gold, Ernest, **Lag of wet-bulb thermometer during rising temperature after frost.** *Meteorological Magazine*, London, 81(956):57, Feb. **1952.** **DWB**—Case of false drop of dew point due to delay in thawing frozen muslin. *Subject Heading:* **1. Psychrometers.**—*C.E.P.B.*

3.9–59 551.508.71

Selezneva, E. S., **O tochnosti izmereniia vlazhnosti samoletnym meteorografom.** [On the accuracy of humidity measurements by an airplane meteorograph.] *Meteorologiia i Gidrologiia*, No. 1:70–72, Sept. **1950.** fig., 2 refs., 3 equations. **DLC**—A special investigation of the coefficient of inertia of the hygrograph (Type CM-43, used in aeroplane soundings of the atmosphere in the U.S.S.R.) during a flight through cumulus and in the laboratory. The coefficient of inertia from many flights was established as = 50 sec. The results of laboratory observations showed higher values because of the lack of ventilation of the hygrograph. The author concludes that it is necessary to mark accurately the time when the airplane enters the clouds. *Subject Headings:* **1. Humidity measurements 2. Aerometeorographs 3. Hygrographs 4. Instrumental errors 5. U.S.S.R.**—*N.T.Z.*

3.9–60 551.508.71 551.508.26

Kaiser, Heinz, **Ein elektrisch registrierender Hygrograph.** [An electrically recording hygrograph.] *Annalen der Meteorologie*, 4(7/9):402–406, **1951.** 3 figs., 4 refs. **DWB**—This distant-recording thermo-hygrograph for microclimatic investigation consists of a horizontal bundle of hair actuating a lever which alters resistance of a fluid column. Temperature is measured by resistance of a copper wire. Clear diagram and example of record given. *Subject Headings:* **1. Distant recording equipment 2. Hygrographs 3. Thermographs.**—*C.E.P.B.*

3.9–61 551.508.71:551.501.4

Maksić, B. (*Geoph. Inst., Univ. of Zagreb, Yugoslavia*), **O pouzdanosti mjerenja vlage pomocu psihrometra.** [The accuracy of humidity measurements with a psychrometer.] *Yugoslavia. Hidrometeorološka Služba. Hidrometeoroloski Glasnik*, 2(1/2):9–26, **1949.** 5 tables, 7 refs., equations. In Croatian; Russian and English summaries, p. 24–26. **DWB**—An analytical method of determining the accuracy of psychrometers is developed through a series of equations representing variations in the accuracy of psychrometer readings with changing dry and wet bulb temperature readings. The equations are applied to varying temperatures and numerical results presented in psychrometric tables. Author points out some inaccuracies in meteorological handbooks on the subject. *Subject Headings:* **1. Psychrometers 2. Instrument accuracy 3. Psychrometer tables.**—*G.T.*

3.9–62 551.508.765:551.574.7

Neel, Carr B., Jr. and Steinmetz, Charles P., **The calculated and measured characteristics of a heated-wire liquid-water-content meter for measuring icing severity.** *U. S. NACA, Technical Note*, 2615, Jan. 1952. 59 p. graphs, diagrs., photos., tables, 16 refs. **DWB**—Initial development has been made of an instrument which could be used to obtain statistical flight data on the liquid-water content of icing clouds and to provide a direct indication of icing severity. The sensing element of the instrument consists of wire of known temperature-resistance characteristics which is heated by passing electrical current through it. The wire is mounted in the air stream and the degree of cooling resulting from evaporation of impinging water droplets is a measure of the liquid-water content of the cloud. Comparisons are made of the liquid-water content as measured with heated wires and absorbent cylinders in an artifically produced cloud. Performance characteristics of a heated-wire instrument are presented. *Subject Headings:* **1. Icing instruments 2. Icing of aircraft 3. Liquid water content of clouds. I. U. S. NACA.**—*Author's abstract.*

3.9–63 551.508.822

Gefunktec Höhenwetter. Die Aerosonde H 48. [Radio communication of weather from high altitudes. The aerosonde H 48.] *Umschau*, Frankfurt a.M., 50(5):151, March

1950. fig. **DLC**—Note on the operation of a radiosonde constructed by GRAW. Pressure, temperature and humidity data are automatically transferred to a microtransmitter and communicated to a receiver on the ground. A picture shows the construction and operation of the equipment in the field. *Subject Heading:* **1. Radiosonde recorders.**—*G.T.*

3.9–64 551.508.822

Hinzpeter, Max, **Eine neue Radiosonde (Weiterentwicklung der Wettersonde nach GRAW).** [A new radiosonde (further development of the GRAW sonde).] *Annalen der Meteorologie*, 4(7/9):393–398, **1951.** 3 figs., table, 5 refs. German and English summaries, p. 393. **DWB**—A Morse-signalling development of the GRAW radiosonde is described with wiring diagram. It has a bimetallic shielded temperature element, double copper-beryllium aneroid and velox-hair hygrometer of small lag, satisfactory even at low temperatures. Technical and electrical details are given. *Subject Heading:* **1. Radiosondes.**—*C.E.P.B.*

3.9–65 551.508.824

Air-launched weather station. *Flight*, London, 60(2218):122, July 27, **1951.** 3 figs. **DLC**—Note on the weather recording instrument "Grasshopper" developed by PERCIVAL D. LOWELL and WILLIAM HAKKARINEN of the U. S. National Bureau of Standards for the U. S. Navy Bureau of Ships. The instrument is parachuted on inaccessible territory and automatically transmits temperature, pressure and humidity data. Details of the instrument are shown in three photographs. *Subject Headings:* **1. Automatic weather stations 2. Recording instruments.**—*G.T.*

3.9–66 551.508.93:551.521.3

Ashburn, Edward V. (*Navy O.T.S., Inyokern, Calif.*), **On the prospects for routine optical soundings in the stratosphere.** *American Meteorological Society, Bulletin*, 32(8):313, Oct. **1951. MH-BH**—In connection with the question of whether routine measurements of the atmospheric scattering of light are practicable for purposes of determining density of the atmosphere, several points are considered and the conclusion drawn that such an optical method provides means for the synoptic meteorologist to explore the atmosphere far beyond the reach of balloons. Reference is made to a photoelectric photometer developed at the U. S. Naval Ordnance Test Station, Pasadena, California, which is the first instrument of its kind with adequate accuracy for the purposes of synoptic meteorologists. *Subject Headings:* **1. Atmospheric scattering 2. Optical soundings 3. Stratospheric density 4. Photoelectric photometers. I. U. S. Naval Ordnance Test Station, Pasadena, California.**—*G.T.*

SYNOPTIC ANALYSIS AND FORECASTING

(*See also items:* 3.9–13, –96, –103, –112, –125, –164, –224)

3.9–67 551.509(02)

Stagg, James M., **Forecasting the weather.** *Nature*, London, 168(4275):574, Oct. 6, **1951. DWB**—Review of: **Neue Methode der Wetteranalyse und Wetterprognose,** by RICHARD SCHERHAG, Berlin (Springer-Verlag) 1948. (*See* MAB No. 1–52, Jan. 1950.) Includes a brief summary of German forecasting procedure. *Subject Headings:* **1. Weather forecasting 2. Textbooks 3. Germany. I. Scherhag, Richard.**—*C.E.P.B.*

3.9–68 551.509:629.12

Bolton, R. G., **Weather forecasts at sea.** *Weather*, 7(5):135–136, May **1952. DWB**—Author suggests that forecasts to ships at sea are of little practical value.[!] *Subject Heading:* **1. Marine forecasting.**—*C.E.P.B.*

3.9–69 551.509.3:551.557.3

Forecasting winds at 30,000–40,000 ft. and above. *Meteorological Magazine*, London, 81(957):79–85, March **1952.** table. **DWB**—Discussion Jan. 14, 1952, opened by R. MURRAY and C. S. DURST. MURRAY discussed representation and forecasting of upper wind flow by isobaric surfaces. DURST described statistical forecasting by vector regression equations and

found that a combination of the two methods gave good results. Several other speakers took part. *Subject Heading:* **1. Winds aloft forecasting.**—*C.E.P.B.*

3.9–70 551.509.3 551.509.5

Knighting, Ernest, **Uncertainty in weather forecasting.** *Weather*, 7(5):131–134, May **1952.** 2 refs. **DWB**—Referring to article by SCHUMANN (*see MAB* No. 9–38, Sept. 1950) author attributes uncertainty in weather forecasting to "uncertainty of idealization"—mathematical symbols idealize the physical concepts—and "uncertainty of specification"—because of insufficient observations. *Subject Heading:* **1. Weather forecasting.**—*C.E.P.B.*

3.9–71 551.509.312

Flohn, Hermann, **Wege zu einer rechnerischen Wettervorhersage.** [Ways to a calculated weather forecast.] *Naturwissenschaftliche Rundschau*, 5(5):198–199, May, **1952. DWB**—A brief summary of the history and present position of numerical forecasting. The electronic computer is not yet fast enough. Errors are introduced by the use of difference equations instead of differential equations, and neglect of radiation, friction, etc., but the position is hopeful. *Subject Headings:* **1. Mathematical forecasting 2. Electronic computers.**—*C.E.P.B.*

3.9–72 551.509.312:681.14

Sawyer, John S., **Electronic computing machines and meteorology.** *Meteorological Magazine*, London, 81(957):74–77, March **1952.** 2 refs. **DWB**—Brief summary of discussion at Cambridge, England, Sept. 6, 1951 and Dunstable, Oct. 1951. It is considered that routine application to forecasting is unlikely for many years but the prospects for other meteorological problems, especially dynamical research, are more promising. *Subject Headings:* **1. Machine methods 2. Mathematical forecasting.**—*C.E.P.B.*

3.9–73 551.509.318:551.515(7)

Massachusetts Institute of Technology, **Analogue selection by major highs and lows and studies of analogue construction by linear combinations of maps.** Contract W-28-099-ac-398. Report No. 10, Aug. 1, **1950.** 29 p.—30 p. of appendix. tables. **DWB**—Two methods of selecting analogs of pressure systems for the United States were tested. One was to compare simultaneous occurrences of the Aleutian and Iceland lows, and of the Pacific and Azores highs. The frequency distribution ratings of two judges led to conclusion that this was not a very good way to select analogs for North America. Inclusion of intensity as well as position of centers of action might improve selection. The second method was by attempting seven methods of linear combination of maps, using 33 stations in North America and testing 4 series of maps selected at random. Actual and predicted pressures are given for 1, 2 and 3 day forecasts. Results were unfavorable from practical standpoint. *Subject Headings:* **1. Analog selection 2. Statistical forecasting 3. North America. I. Wadsworth, G. P. II. Contract W-28-099-ac-398.**—*M.R.*

3.9–74 551.509.318:551.515.8

Massachusetts Institute of Technology, **Statistical kinematics of migratory North American highs and lows.** Contract W-28-099-ac-398, Report No. 12, Feb. 1, **1951.** 10 p. 8 tables, equations. **DWB** Regression data of migratory highs and lows and equations for calculating their progress are presented. The regression functions were set up on both angular and regular velocity with or without a Coriolis-type correction and the best results are claimed to have been obtained from those accounting for regular velocity with a Coriolis-correction. *Subject Headings:* **1. Air mass movements 2. Statistical forecasting 3. Regression equations. I. Wadsworth, G. P. II. Contract W-28-099-ac-398.**—*G.T.*

3.9–75 551.509.318(261)

U. S. Air Weather Service, **Comparison of analogue selection methods.** *U. S. Air Weather Service, Technical Report* 105–70, April **1951.** 31 p. graphs, tables. **DWB**—An area of the North Atlantic was selected to make an objective analysis of the efficiency of various methods of selecting analog maps for forecast purposes. Northern Hemisphere Historical Weather Maps were used as a basis, and I.B.M. techniques used to select analogs by means of surface pressures and location of centers of highs and lows. It was found that variance of pressure

from day to day gave a higher correlation than did subjective selection of analogs by the forecaster. Correlations of analysis are shown in tables and figures. *Subject Headings:* **1. Analog selection 2. Statistical forecasting 3. Forecast verification 4. North Atlantic. I. Jones, Rodney A.**—*M.R.*

3.9–76 551.509.34:551.577.2(771)

Palmer, Wayne St. Clair, **On summer precipitation forecasting in southwestern Ohio.** U. S. Weather Bureau, May 1951. 14 p. diagr., ref., append. **DWB**—A semiobjective method of forecasting noon to midnight precipitation is developed for Cincinnati and vicinity. Data used are the 0030C surface data for the same date and the 2100 upper air data of the previous date. One parameter chosen, front orientation at the surface, requires the prognostication of the present surface pressure pattern and thus introduces a degree of subjectivity into the forecast. Various synoptic situations are analyzed and classified and the resultant method tested on 8 months of dependent data with good results. A work sheet is attached for guidance to forecasters. *Subject Headings:* **1. Precipitation forecasting 2. Objective forecasting 3. Cincinnati, Ohio. I. U. S. Weather Bureau.**—*M.P.K.*

3.9–77 551.509.39:632.187

Beall, H. W., **Forecasting weather and forest fire hazard from local observations.** *Canada. Dominion Forest Service. Forest-fire Research Note*, No. 10, 1948. 53 p. diagr., tables, 11 refs., appends. **DWB**—To aid the layman, professing no profound technical knowledge, in making a weather forecast based on local observations alone, certain rules-of-thumb relating weather elements to wind, pressure and fronts are devised. No data are available relating to accuracy of forecasts made by the suggested simple methods applied to the region from Alberta to New Brunswick. *Subject Headings:* **1. Fire weather forecasting 2. Amateur forecasting 3. Fire danger rating 4. Rules of thumb 5. Canada.**—*M.P.K.*

3.9–78 551.509.62:551.586:634.3

Angus, D. E., **Inclined axis frost fan trials in citrus orchards.** *Australia. Commonwealth Scientific and Industrial Research Organization. Section of Meteorological Physics, Sectional Report*, No. 1, Jan. 1951. 24 p. tables, diagr., biblio. **DWB**—The author tested the hypothesis that the range of the Australian type vertical axis fan which "sucks" down warm air can be increased by tilting the axis of the fan at a rather large angle to both the vertical and the horizontal. A description of the fan and of the experimental design and the temperature measurements obtained at various angles of tilt are given. Both the area and the range of the 2°F temperature rise increased progressively as the axis of the fan was tilted up to 62° from the vertical. *Subject Headings:* **1. Frost protection 2. Orchard heating 3. Frost fans 4. Australia.**—*I.L.D.*

3.9–79 551.509.9:625.1:614.8

Sakamoto, F. and Kumano, M., **Railway accidents owing to some weather factors on Sanin-Line.** *Journal of Meteorological Research*, Tokyo, 3(6):187–193, March 1951. 3 figs., 15 tables. In Japanese, English summary p. (13). **DWB**—The frequency of railway accidents rises when the snow depth exceeds 20 cm and the wind velocity is greater than 7 m/sec; and when typhoons produce rainfall greater than 70 mm/day or 450 mm over a few days. Fires along railroad lines occur seldom when the minimum relative humidity is greater than 70% and the wind velocity is less than 6 m/sec. *Subject Headings:* **1. Weather effects 2. Railway accidents 3. Japan.**—*From author's abstract.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

STRUCTURE OF THE ATMOSPHERE

(*See also items:* 3.9–9, –33, –46, –118, –129, –132, –151, –166)

3.9–80 551.510.41:551.521.63

Lettau, Heinz, **Zur Frage der Sauerstoff- und Wasserdampf-Bilanz der Atmosphäre.** [On the oxygen and water vapor balance of the atmosphere.] *Zeitschrift für Naturforschung*,

Tübingin, 7a(3/4):270–273, March/April **1952.** 9 refs. **DLC**—Criticizes theory of HARTECK and JENSEN that oxygen is produced by photochemical decomposition of water vapor above 16 km, since there is too little water vapor. *Subject Headings:* **1. Atmospheric evolution 2. Solar radiation effects.**—*C.E.P.B.*

3.9–81 551.510.41:546.214 551.510.534

Regener, Erich, **Über Schwankungen des Ozons in der Troposphäre und Stratosphäre.** [On fluctuations of ozone in the troposphere and stratosphere.] *Journal of Atmospheric and Terrestrial Physics*, London, 2(3):173–182, **1952.** 17 figs., 12 refs. English summary p. 173. **DWB**—Ozone content fluctuates greatly at all heights. As it is destroyed in 1–3 hours in dusty surface air it must be brought from above. At Friedrichshafen, on quiet, days there is a maximum about 15 h and night minimum; in turbulent weather the latter disappears. Diurnal variation changes with height and is smoothed out on mountain peaks, the ozone-poor surface air subsiding into the valleys at night. Vertical variation up to 9 km is related to temperature and cloud layers. Marked variations of distribution up to 30 km are compared with air trajectories at 16 km; west winds at Weissenau show strong maximum above 20 km, ENE winds weak maximum below 20 km. *Subject Headings:* **1. Ozone variations 2. Upper atmosphere.**—*C.E.P.B.*

3.9–82 551.510.42:551.21

Nielsen, Niels, **Heklas Udbrud, 1947–48.** [The eruption of the Hekla volcano, 1947–48.] *Svensk Geografisk Arsbok*, Lund, 24:200–211, **1948.** photos. In Danish; English summary p. 211. **DLC**—Hekla (on Iceland) has erupted 20 times since 1104 A.D. The most notable eruption was in 1766–68 and another in 1845–46. The present eruption began March 29, 1947 at 5:30 a.m. without warning. The column of ash and vapor which was ejected that day extended to 27 km height (wind was NW). Two hundred million m^3 of solid material was blown sky high. The explosion was heard 300 km away. *Subject Headings:* **1. Volcanic eruptions 2. Hekla eruption—1947 3. Volcanic dust 4. Iceland.**—*M.R.*

3.9–83 551.510.42:628.54

Skachko, M. F. and Uzhov, V. N., **Novye otechestvennye apparaty dlia bor'by s sagriazneniem atmosfernogo vozdukha.** [New apparatus devised in the U.S.S.R. for combating atmospheric pollution.] *Gigiena i Sanitariia*, Moscow, 17:21–24, **1952.** 3 tables, ref. **DLC**—A description of the structure and operation of equipment for removing ashes from the smoke produced during the burning of powdered fuel by power stations in Moscow. The device consists of a combination of centrifuges and vertical lamellar electric filters with precipitating electrodes within the filter. The efficiency of the apparatus is discussed. *Subject Headings:* **1. Atmospheric pollution 2. Industrial ash elimination 3. Smoke abatement 4. U.S.S.R.**—*I.L.D.*

3.9–84 551.510.42

Watson, H. H., **Alberta forest-fire smoke.** *Weather*, 7(4):128, April **1952.** 2 refs. **DWB**—Blue sun and moon of 26 Sept. 1950 required smoke particles of nearly uniform size. Author suggests this was brought about by distillation from smaller to larger particles. *Subject Headings:* **1. Blue moon 2. Blue sun 3. Smoke pall Sept. 1950.**—*C.E.P.B.*

3.9–85 551.510.52/3

*Dewar, D., **Extreme tropopause pressure.** *Meteorological Magazine*, London, 81(959):154–155, May **1952.** table. **MH-BH**—Table gives for each month maximum and minimum tropopause pressures and corresponding heights at Larkhill (51°11′N) and Lerwick (60°8′N) 1948–50. *Subject Heading:* **1. Tropopause height.**—*C.E.P.B.*

3.9–86 551.510.534:523.38

Paetzold, H. K., **Erfassung der vertikalen Ozonverteilung in verschiedenen geographischen Breiten bei Mondfinsternissen.** [Determination of vertical ozone distribution at various latitudes during eclipses of the moon.] *Journal of Atmospheric and Terrestrial Physics*, London, 2(3):183–188, **1952.** 6 figs., table, 9 refs., 3 equations. English summary p. 183.

DWB—Describes a method of measuring vertical distribution of ozone by observations on 6000 Å near edge of earth's shadow. Results agree with distributions from balloon ascents on neighboring days. *Subject Headings:* **1. Ozone measurement techniques 2. Ozone distribution 3. Lunar eclipses.**—*C.E.P.B.*

3.9–87 551.510.534:551.515

*Pekeris, Chaim Leib, **Report on atmospheric ozone as a possible meteorological factor.** [n.d.] 13 p. 8 figs., 3 tables, 18 refs. Typescript. **DWB**—In this survey of recent research reported by various scientists, the amount and horizontal and vertical distribution of atmospheric ozone, its advection, seasonal and diurnal variations, correlation with cyclones, anticyclones, pressure and temperature and possible effect on weather are discussed and pertinent data obtained at various stations both in the Northern and Southern Hemispheres presented in tables, graphs and charts. *Subject Headings:* **1. Ozone distribution 2. Ozone variations 3. Atmospheric disturbances.**—*G.T.*

UPPER ATMOSPHERE—IONOSPHERE

(*See also items:* 3.9–50, –166)

3.9–88 551.510.535:621.396.11

Lindquist, Rune, **Polar blackouts recorded at the Kiruna Observatory.** *Gothenburg, Sweden. Chalmers Tekniska Högskola, Handlingar*, No. 103, **1951.** 24 p. photos., graphs, refs. Price: kroner 3-. **DWB**—"Polar blackout" is the name H. W. Wells gave the phenomenon of fadeout that shows no connection with solar flares, contrary to the ordinary ones occurring in the lower latitudes. The phenomenon was studied by E. V. Appleton (1932–1933) and by Bramholt and Seaton (1941). In the present study at Kiruna (67°50′N, 20°14.5′E, geomagnetic coordinates 65°19′N, 115°30′E) a panoramic recorder (frequency range 1–16 Mc/s in 30 sec) and a recording magnetometer were used. The preliminary results indicate that an abnormally high absorption, caused by the impact of some ionizing agent (maximum probably occurs below the 100 km level)—some sort of corpuscular bombardment—is the cause. *Subject Headings:* **1. Ionosphere 2. Microwave propagation 3. Polar blackouts 4. Sweden. I. Gothenburg, Sweden. Chalmers Tekniska Högskola. Research Laboratory of Electronics II. Wells, H. W.**—*W. N.*

3.9–89 551.510.535:551.594.51:551.521.4

Vegard, Lars, **Report on recent work on ionospheric phenomena and on solar and terrestrial relationship.** (In: International conference on the emission spectra of the night sky and aurorae, London, 1947, **Papers. 1948.** p. 82–91. 3 refs.) **DWB**—A summary of many separate investigations reported in papers published by the author since 1940 in *Geofysiske Publikasjoner.* The problems discussed are: 1) detection and interpretation of new lines in auroral spectrum; 2) wave length and relative intensity of the weak component of the red O(I) doublet; 3) variability of intensity distribution within the auroral spectrum; 4) determination of ionospheric temperature from auroras at different altitudes and in sunlight; 5) origin and excitation of sodium line in twilight; 6) coronal phenomena and their relation to solar and terrestrial processes; 7) probability of an O atom losing its excitation energy through collisions. It is suggested that the sodium enters the atmosphere from the sun. *Subject Headings:* **1. Auroral physics research 2. Light of the night sky 3. Auroral spectra 4. Temperature of the ionosphere 5. Coronal phenomena 6. Earth's corona. I. Kvifte, G. II. Tønsberg, E.**—*M.R.*

3.9–90 551.510.535

Waynick, A. H. (*Pennsylvania State College*), **A note on the Conference on Ionospheric Research.** *U. S. Air Force. Cambridge Research Laboratories, Geophysical Research Papers*, No. 7:13, Dec. **1950. DWB**—A short introduction to the symposium held at Pennsylvania State College. Twelve papers were presented; two detailed summaries of the results of the conference are given. Separate abstracts of the individual papers will be published. *Subject Headings:* **1. Conferences 2. Symposia 3. Ionospheric research.**—*A.A.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

(*See also items:* 3.9–13, –152, –168)

3.9–91 551.511:551.557

Arakawa, Hidetoshi (*Tokyo, Met. Res. Inst.*), **The criterion of dynamic stability of zonal motion including the vertical shear.** *Geofisica Pura e Applicata*, 20:56–61, July–Dec. **1951.** 7 refs., 12 equations. **MH-BH**—Many writers treated on the problem of dynamic instability of westerly flow due to the excessive horizontal shear, and the present author discusses the corresponding dynamic instability due to the vertical shear. The critical vertical shear in indifferent stratification is given by the condition—the meridional component of absolute vorticity vanishes—and is an approximate negative value of 10^{-3} sec^{-1} in middle latitude. However the critical vertical shear in normal stable stratification is a fairly large negative value of 2 sec^{-1}. It might be emphasized that the problem of this study differs from RICHARDSON's criterion of turbulence, for the present author discusses the condition under which the zonal flow is dynamically stable, while RICHARDSON expressed the condition under which the turbulence will decrease. *Subject Headings:* **1. Dynamic instability 2. Zonal circulation 3. Dynamics of the atmosphere.**—*Author's abstract.*

3.9–92 551.511

Kallós, Imre, **A Coriolis-féle és a centrifugális erö szerepe a légmozgásokban és azok viszonya.** [Role of Coriolis and centrifugal forces in atmospheric movements and the quotient of these two forces.] *Idöjárás*, 54(1/2):30–33, Jan./Feb. **1950.** 2 figs., 20 equations. **DWB**—The vortical pattern of air circulation is described as a synthesis of the gradient and centrifugal forces, analyzed through a series of equations and represented in schematic drawings. The relative movement of the earth and air, the velocity and direction of the circulation, and the geographical latitude are accounted for. *Subject Headings:* **1. Coriolis force 2. Dynamics of the atmosphere 3. Circulation patterns.**—*G.T.*

3.9–93 551.511:551.501.81

Jones, R. F., **Radar evidence of the formation of Bénard convection cells.** *Meteorological Magazine*, London, 81(959):152–153, May **1952.** 2 photos. **MH-BH**—On Dec. 31, 1951, radar photographs from East Hill, Bedfordshire, showed many small cells 1750 ft deep with a tendency to alignment. Attributed to cooling of top of cloud by radiation after sunset; 2°F would suffice. *Subject Headings:* **1. Convective cells 2. Radar observation.**—*C.E.P.B.*

3.9–94 551.511

†Van Mieghem, Jacques, **La stabilité des mouvements atmosphériques.** [The stability of atmospheric movements.] (In: International Meteorological Organization. Aerological Commission, Toronto, 1947. **Rapport final, Appendice XI.** rev. ed., **1948.** 9 p. 22 refs., equations.) **MH-BH**—Two methods of determining hydrostatic equilibrium described—method of perturbations and dynamic method—agree that equilibrium is stable when potential temperature increases with height. Hydrodynamic equilibrium is also examined by perturbation and dynamic methods, and those of KLEINSCHMIDT and HOILAND-FJORTOFT which apply equation of energy to a geostrophic current and to a permanent circular flow around earth's axis. A practical application of the last is set out. *Subject Headings:* **1. Stability 2. Dynamic stability.**—*C.E.P.B.*

GENERAL CIRCULATION

(*See also item:* 3.9–108)

3.9–95 551.513.1

Lorenz, Edward N., **Flow of angular momentum as a predictor for the zonal westerlies.** *Journal of Meteorology*, 9(2):152–157, April **1952.** 5 tables, 10 refs., 7 equations. **MH-BH**—The change of total angular momentum north of a given latitude, plus the total torque on the earth's surface, are expressed in terms of average low-level westerly wind and equated to the flow of angular momentum across the latitude. This simple equation $dU/dt - KU = a\tau$ is tested

by data from northern hemisphere maps. Some moderately high coefficients show negative correlation of τ with both dU/dt and U. The equation may be useful for forecasting zonal wind speed and also gives information about nature of flow of angular momentum. *Subject Headings:* **1. Zonal circulation 2. Momentum transfer.** *C.E.P.B.*

3.9–96 551.513.1:551.509.312

Mintz, Yale and Kao, Shih-kung, **A zonal index tendency equation and its application to forecasts of the zonal index.** *Journal of Meteorology*, 9(2):87–92, April **1952.** 3 figs., table, 3 refs., 15 equations. **MH-BH** A simplified equation for rate of change of zonal component in a ring between two latitudes is found in terms of difference of product of N–S and E–W components and zonal torque across the ring, and weighted zonal index in the ring. This was tested for 35–45–55–65°N daily for Jan. 1949, M.S.L. to 100 mb. The flux convergence was quasi-periodic in 3–5 days, especially in 35–45°. Correlation between observed and computed values was +0.66 to +0.81; main source of error is torque in circulations crossing mountains. Forecasts of change of zonal index by the equation were moderately successful. The analytic solution for a simple damped harmonic variation is presented. *Subject Heading:* **1. Zonal index.**—*C.E.P.B.*

3.9–97 551.513.1

Wulf, Oliver R. and Davis, Leverett, Jr., **On the efficiency of the engine driving the atmospheric circulation.** *Journal of Meteorology*, 9(2):79–82, April **1952.** table, 6 refs., 3 equations. **MH-BH** Earth, atmosphere and water vapor are considered as an engine heated by effective radiation. Its efficiency is calculated taking account of horizontal and vertical temperature distribution, absorption and emission of radiation, and an entropy budget set out. A rough calculation gives (unit 10^{-3} watt day): total entropy gain 11.4, loss 13.0, leaving 1.6 to be accounted for by absorption at a higher and reradiation at a lower temperature. Most of this comes from conversion of kinetic energy of large scale convection into heat through turbulence and viscosity. *Subject Headings:* **1. Atmospheric circulation 2. Entropy.**—*C.E.P.B.*

ATMOSPHERIC DISTURBANCES

(*See also items:* 3.9–8, –72, –73, –87, –160, –185, –216, –223, –233)

3.9–98 551.515.1

§Rodewald, Martin, **Atlantik-Orkane im März 1952.** [Atlantic hurricanes in March 1952.] *Wetterlotse*, 39:75–80, April **1952.** 3 figs. **DWB**—Storm activity in March was mostly in 30–50°N. An occluded depression on March 13–14 about 46°N, 18°W gave winds up to 75 knots (chart). *Subject Heading:* **1. Barometric depressions.**—*C.E.P.B.*

3.9–99 551.515.1

§Rodewald, Martin, **Der Februar-Orkan vor Cape Cod.** [The February hurricane near Cape Cod.] *Wetterlotse*, 37:45–47, March **1952.** fig. **DWB** Account of depression of Feb. 17–19, 1952, with chart for 18th. Wind much lighter over cold than warm water. *Subject Heading:* **1. Barometric depressions.**—*C.E.P.B.*

3.9–100 551.515.1

Ross, Robert G., **The Orkney hurricane.** *Weather*, 7(4):116–119, April **1952.** 4 photos. **DWB** –Jan. 15, 1952, SW gale veering W-WNW, estimated speed 135 mph in peak gusts. Great damage done. *Subject Heading:* **1. Hurricane damage.**

3.9–101 551.515.11

Hollmann, Günther, **Über Verlagerung und Wetterwirksamkeit von Kaltlufttropfen. Theorie.** [On the displacement and weather influence of cold lows. Theory.] *Zeitschrift für Meteorologie*, 6(1):8–15, Jan. **1952.** 14 refs., 50 equations. **MH-BH**—A mathematical discussion is based on a model consisting of a stationary surface pressure field with parallel straight winds, overlain by cyclonic and anticyclonic whirls related to islands of cold and warm air. The resulting vertical circulation and associated weather are deduced. There is no

change of pressure at the centers of the islands, but the greatest change occurs in the cold island. *Subject Heading:* **1. Cold air bubbles.**—*C.E.P.B.*

3.9–102 551.515.12(411)

§Douglas, Charles K. M., **Synoptic aspects of the storm over North Scotland on January 15, 1952.** *Meteorological Magazine*, London, 81(958):104–106, April 1952. 3 figs. **DWB**—Shows chart of depression for 6 h Jan. 15, anemograms and barogram. Lowest pressure at Lerwick 952 mb; at Grimsetter (Orkneys) gusts exceeded 120 mph. *Subject Headings:* **1. Depressions 2. Gales 3. North Scotland.**—*C.E.P.B.*

3.9–103 551.515.13:551.509.31(7)

Carr, J. A., **Movement of the storm of September 25–30, 1951.** *Monthly Weather Review*, 79(9):183–187, Sept. 1951. 8 figs., table. **DWB**—Problems of forecasting direction and rate of a storm's progress are discussed in conjunction with various phases of a case history and illustrated by surface and upper air charts. The storm of Sept. 25–30, 1951 illustrates a deep, occluding low which moved from the northern Plains across the Great Lakes and out to sea over Labrador. *Subject Headings:* **1. Cyclone tracks 2. Synoptic studies.**—*G.T.*

3.9–104 551.515.13

Hesse, Walter, **Über Andauer und Häufigkeit von Steuerungslagen.** [On the duration and frequency of steering situations.] *Zeitschrift für Meteorologie*, 6(3):65–68, March 1952. 3 figs., 7 refs. **MH-BH**—Over Europe 1935–44, 16 steering types are defined. For each type frequencies of different durations (3 to over 10 days) and absolute monthly frequencies are shown. *Subject Heading:* **1. Steering.**—*C.E.P.B.*

3.9–105 551.515.3/4(54)

Chandra, K., **Destructive thunderstorm over Ambala on 18 May 1950.** *Indian Journal of Meteorology and Geophysics*, 2(3):235–238, July 1951. 13 figs., append. **MH-BH**—A severe thunderstorm with winds attaining hurricane force is described. *Subject Headings:* **1. Thunderstorms 2. Cyclonic storms 3. Ambala, India.**—*A.A.*

3.9–106 551.515.4

Sheppard, P. A., **An experiment in geophysical research.** *Nature*, London, 169(4298):427–428, March 15, 1952. **DWB**—A philosophical review of "The thunderstorm" (report of the Thunderstorm Project, 1949) as a heroic attempt at integral research. *Subject Heading:* **1. Thunderstorm Project.**—*C.E.P.B.*

3.9–107 551.515.7(84)

James, R. W., **The structure of steady-state anticyclones.** *Australian Journal of Scientific Research, Ser. A, Physical Sciences*, 4(3):329–343, Sept. 1951. 2 figs., table, 5 refs., 16 equations. **MH-BH**—It is found that symmetrical anticyclones of the Australian region exhibit roughly similar pressure profiles. The total pressure rise within a high is approximately proportional to the area covered by the disturbance, large systems in higher latitudes being more intense than small systems in lower latitudes. These structural properties are shown to be a consequence of the requirement for gradient-wind balance within an anticyclone, which requirement is shown to limit the intensity of a high of specified size. The theory indicates that the variation of the size of anticyclones should be restricted, and that disturbances in higher latitudes should have higher mean intensities. Both these requirements are borne out by observation. *Subject Headings:* **1. Anticyclone structure 2. Anticyclone mechanics 3. Australia.**—*Author's abstract.*

3.9–108 551.515.7:551.513.2:551.589.1(266)

Namias, Jerome, **The great Pacific anticyclone of winter 1949–1950: a case study in the evolution of climatic anomalies.** *Journal of Meteorology*, 8(4):251–261, Aug. 1951. 26 figs., table, 11 refs. **MH-BH**—Movements of the centers of action (Pacific anticyclone) based on 700 mb mean monthly charts during Dec. 1949 to March 1950 are shown graphically and the resulting anomalies of temperature over the United States discussed and illustrated. The tracks of cyclones over the Pacific showed a progressively varying and anomalous tendency

during this period when the Pacific anticyclone cell migrated from near Hawaii to the Bering Sea and Yukon Valley. A tentative theory as to cause of persistence and motion of this cell, based on differential heating or variations in surface temperatures which are self-induced, is proposed. *Subject Headings:* **Climatic anomalies 2. Pacific anticyclones 3. Graphical presentation.**—*M.R.*

3.9–109 551.515.71 551.515.7:523.74(798)

§Bodurtha, Frank T., Jr., **An investigation of anticyclogenesis in Alaska.** *Journal of Meteorology*, 9|2|:118–125, April 1952. 14 figs., table, 25 refs., 2 equations. **MH-BH**—Frequencies of anticyclogenesis plotted by 5° squares N of 40° show a maximum in Alaska (65–70°N, 130–135°E.). Air mass contributions at different levels are given for 19 cases of Alaskan anticyclogenesis and detailed synoptic analysis of five. A model shows warm air advection and adiabatic cooling to W. and inflow as cold air at 200 mb over a previously existing cold air mass in Alaska. Anticyclogenesis is more frequent at high than low sunspot numbers. *Subject Headings:* **1. Anticyclogenesis 2. Sunspot effects 3. Alaska.**—*C.E.P.B.*

3.9–110 551.515.8:551.515.3:551.51

Brunk, Ivan W. (*U. S. Weather Bureau, Chicago*), **Squall lines and tornadoes.** U. S. Weather Bureau, May 1951. 22 p. 21 refs. **DWB**—The term squall line is defined, and the difficulty in identifying and following squall lines on synoptic charts mentioned. One of the best methods has proven to be the identification of surface wind shift lines and verification by the analysis of pilot reports of severe turbulence. The relationship of squall lines to WBAN instability lines was studied, and it was found that the latter account for only 17% of the severe turbulence reports, whereas squall lines account for over 70%. The diurnal and seasonal occurrence of squall lines was analyzed, and it was found that they occur most often in late spring and summer and in late afternoon, but they may occur at any time and any season. They usually occur just ahead of a cold front. Meteorological (wind, pressure and rainfall) and flying (turbulence) conditions are analyzed on the basis of numerous cases, and the relationship of squall lines to thunderstorms and tornadoes discussed. Forecasting squall lines depends on ability to forecast thunderstorms and cold fronts. *Subject Headings:* **1. Squall lines 2. Cold fronts 3. Atmospheric turbulence 4. Tornadoes 5. Thunderstorms 6. Synoptic analysis. I. U. S. Weather Bureau.**—*M.R.*

3.9–111 551.515.8(4):551.524.35(4)

§Buschner, Werner, **Untersuchungen über Verlagerung, Aufbau und Dynamik zweier winterlicher Kaltlufttropfen. Diagnose der Kaltlufttropfen vom 13. bis 16. Dezember 1946 und vom 27. bis 30. Januar 1947.** [Research on the displacement, development and dynamics of two winter cold lows. Diagnosis of cold lows of Dec. 13–16, 1946 and Jan. 27–30, 1947.] *Germany. Deutscher Wetterdienst in der US-Zone. Berichte*, No. 23, 1951. 30 p. charts, graphs, tables, refs. Price: DM 5.80. **DWB**—A detailed study of the large scale weather situation, the origin and development and the dynamics (radiation, air flow, vertical motions and trajectory) of two typical cold lows (which do not appear on surface synoptic charts) which occurred over Germany Dec. 1946 and Jan. 1947. Other examples are cited, and the difference between stationary and moving between summer and winter seclusions, described. Besides the synoptic and aerological diagrams and charts, the attending weather conditions are outlined. *Subject Headings:* **1. Cold lows 2. Seclusions 3. Synoptic studies 4. Central Europe.**—*M.R.*

3.9–112 551.515.8:551.509.3

§Carr, J. A. (*U. S. Weather Bureau, Wash., D. C.*), **Genesis of winter weather over west Texas.** *Monthly Weather Review*, 79|11|:212–214, Nov. 1951. 5 figs. **DWB**—Development of the synoptic situation over the United States in November 1951 is outlined. Surface and 5000 mb pressure charts and charts showing minimum temperature and snow depth are presented. Author notes a departure from the usual development inasmuch as the cold was imported by a high which originated over Alberta, and moved slowly into S.E. Colorado where it became stationary instead of coming down directly from the Canadian Plains. *Subject Headings:* **1. Synoptic analysis 2. Cold fronts 3. Texas.**—*G.T.*

3.9–113 551.515.8(747/8)(771)

§Carr, J. A., **An occluding wave, Oct. 7, 1951.** *Monthly Weather Review*, 79(10):200–204, Oct. 1951. 8 figs. **DWB**—The results of an hour-to-hour study of the movement of a cold front with an occluded warm front and of the evolution of the two fronts prior to the occlusion are presented on charts with explanatory notes in chronological order. The data were obtained from records for Pennsylvania, Ohio and New York. The effects of topography are considered and cross sections of the vertical structure of the occlusion presented and analyzed. *Subject Headings:* **1. Occluding waves 2. Frontal analysis 3. Topographic effects 4. Pennsylvania 5. Ohio 6. New York.**—*G.T.*

3.9–114 551.515.8:551.515.3(52)

§Fujita, T., **Micro-analytical study of cold front.** *Geophysical Magazine*, Tokyo, 22(3):237–277, Feb. 1951. 40 figs., 6 refs. **MH-BH**—A most elaborate and detailed study of a cold front situation which resulted in a tornado at Enoura in the Fukuoka Prefecture, Japan, and one at Oura near Matsuyama, on Sept. 26, 1948. Surface and upper level synoptic charts for the Far East, cross sections, "four dimensional" charts showing precipitation or pressure vs. area and time, automatic records, schematic diagrams showing distribution of elements in the system, time cross-sections of wind, temperature and humidity up to 3 km, isopleths of pressure, temperature and precipitation for every 20 minutes during the day of Sept. 26, 1948 are presented and discussed. Two special features are treated: 1) heavy rain cells occurring prior to the warm front and 2) cold front accompanied by no appreciable rain. The multiple structure of the cold front is nicely illustrated. Finally, the absorption of the cold air into the primary cyclone is discussed. *Subject Headings:* **1. Synoptic aerological studies 2. Cold fronts 3. Tornadoes 4. Japan.**—*M.R.*

3.9–115 551.515.8:551.553.8:556.1(433)

Müldner, Willibrord, **Die Windbruchschäden des 22.7.1948 im Reichswald bei Nürnberg, ein Beispiel für ein Wirbelfeld als Teilerscheinung einer Böenfront.** [The wind damage of July 7, 1948 in the state forest near Nürnberg, an example of a vorticity field as part of a squall line.] *Germany. Deutscher Wetterdienst in der US-Zone. Berichte*, No. 19:3–29, 1950. 32 figs., 8 tables, 29 refs., 20 equations. Price: DM 4.—for whole No. 19. **DWB**—A detailed description is presented of the behavior of pressure, precipitation, temperature and wind during the passage of the squall line, of the weather situation at the ground and in the upper atmosphere, and of the damage. Charts are given showing pressure changes at various hours, the movement of the squall line, temperatures at various elevations. The wind storms of the vorticity field are analyzed with the aid of tornado models developed by LETZMANN; the wind velocity is determined from the wind force at specific localities; the tornado-like winds are explained thermodynamically and the recent concepts of turbulence theory (HEISENBERG) are applied to an analysis of the vorticity field. *Subject Headings:* **1. Squall lines 2. Wind damage 3. Gales 4. Vorticity field 5. Nürnberg, Germany.**—*I.L.D.*

3.9–116 551.515.81:551.558.21

§Freeman, John C., Baily, J. F. and Byers, Horace R., **Synoptic study of squall lines associated with internal waves.** (In: Chicago. University. Dept. of Meteorology. **Contract Cwb-8136, Final Report on Cooperative Research Project on Severe Storms,** Sept. 1951. p. 2–19. charts, photo.) **DWB** A squall line is defined as a synoptically significant line marking one boundary of a region of convective precipitation, without reference to mechanism for precipitation formation. Three types of large-scale internal waves have been found to trigger showers or thunderstorms. The first type is the Tepper pressure jump, where moist air exists above a stable layer so that the "jump" on the boundary sets off the convective activity. The second type has been studied in the laboratory by P. GARRIEL of Grenoble, France, who has provided a beautiful photograph of the internal wave between fresh and salt water in a channel with a triangular obstacle across it. In the atmosphere the case is that of air moving fastest under a shallow inversion, and is similar to internal waves (QUENEY) or lee waves (HESS and WAGNER) studied for the east slope of the Rocky Mountains. The main difference is that the moist air flows over a cold front instead of a mountain massif. The third model is one wherein the internal wave occurs in a high level stable layer, the vertical

motion of the wave providing the trigger action. Several situations which illustrate the above types of trigger action (by internal waves) are analyzed and discussed in detail, with schematic diagrams, isentropic charts, hourly teletype sequences, isochronal charts showing movement of squall lines, etc. The sequences chosen are for July 12–14, and Sept. 9–12, 1947, and June 8–10, 1950. *Subject Headings:* **1. Squall lines 2. Synoptic studies 3. Thunderstorm forecasting 4. Internal waves. I. Contract Cwb-8136 II. Chicago. University. Dept. of Meteorology.**—*M.R.*

RADIATION

(*See also items:* 3.9–2, –66, –80, –89, –137, –142, –187, –225, –231)

3.9–117 551.521(02)(47)

Kalitin, Nikolaĭ Nikolaevich, **Luchi solntsa.** [Solar radiation.] Moscow, Akademiia Nauk, **1947.** 109 p. photos., diagrs., graphs, tables, bibliog. **DLC**—A simple but accurate and quantitative discussion of the many aspects of solar radiation as it affects the earth's atmosphere, the earth and life on the earth. The author (who recently passed away), was one of the world's outstanding authorities on solar radiation. The radiational characteristics of the sun, effect of sunspots, the solar constant, the absorption by various elements in the atmosphere, effect of volcanic activity, total radiation received at the surface of the earth, albedo, spectral distribution of energy, regional and seasonal variations, scattering, heat and radiation balance of the atmosphere, effect on plants of different wave lengths, healing power of rays, solar heating devices of various types, etc. are all dealt with in separate chapters which are profusely illustrated with photographs, graphs and tabular data. *Subject Headings:* **1. Solar radiation research 2. Solar activity 3. Solar influences 4. Solar heating 5. Radiation balance 6. Textbooks 7. U.S.S.R.**—*M.R.*

3.9–118 551.521:551.510.5

Hinzpeter, Hans, **Ergebnisse neuerer Arbeiten der meteorologischen Strahlungsforschung.** [Results of recent work on meteorological investigation of radiation.] *Zeitschrift für Meteorologie*, 6(2):40–43, Feb. **1952. MH-BH**—A summary and discussion of R. M. Goody and G. D. Robinson, "Radiation in the troposphere and lower stratosphere." (*See MAB* No. 2.6–63, June 1951.) *Subject Headings:* **1. Radiation 2. Atmospheric structure.**—*C.E.P.B.*

3.9–119 551.521.1

Drummond, Andrew Jamieson and Dirsten, M. K. (*S. Africa Weather Bureau*), **The measurement of solar radiation in South Africa.** *South African Journal of Science*, Johannesburg, 48(3):103–110, Oct. **1951.** 3 figs., 3 tables, 8 refs. **DLC**—A new network for solar radiation measurement was established by the South African Weather Bureau with headquarters at Pretoria and about 20 stations are planned throughout the Union. The equipment of the network is described and a solarimeter recording diffuse sky radiation shown in a photo. The program is planned to include measurement of the amount of solar and sky radiation, of depletion because of atmospheric factors, of spectral distribution, etc. Results of measurements carried on during the first half of 1951 are presented in tables. They include data on monthly amounts of radiation at the limit of the atmosphere, on depletion due to 4 different atmospheric factors, on frequency distribution of total (T) and diffuse (D) radiation and on monthly means of the ratio D/T and extremes of D and T. Earlier measurements are also reported and curves of variability of daily totals of sun and sky radiation measured at four stations from 1940 to 1944 are presented. *Subject Headings:* **1. Solar radiation 2. Sky radiation 3. Solarimeters.**—*G.T.*

3.9–120 551.521.14

Griesseier, H., **Zur Reflexion der Strahlung an einer unbewegten Wasseroberfläche.** [Reflection of radiation at a calm water surface.] *Zeitschrift für Meteorologie*, 6(2):53–57, Feb. **1952.** 3 figs., 13 equations, 10 refs. **MH-BH**—Author discusses partial reflection of radiation by an infinite smooth water area. From Fresnel's expression involving refractive index it is calculated that while vertical radiation is almost completely reflected, the proportion falls off very rapidly (to about 5% with sun's elevation 60°). Reflection of diffuse sky radiation

is calculated, on the assumption of a uniform cloud cover, as 5.6%, in good agreement with observed values. *Subject Heading:* **1. Albedo.**—*C.E.P.B.*

3.9–121 551.521.3:551.547

Kaplan, Lewis D. (*Washington, D. C.*), **On the pressure dependence of radiative heat transfer in the atmosphere.** *Journal of Meteorology*, 9(1):1–12, Feb. **1952.** fig., 5 tables, 29 refs., 30 equations. **MH-BH**—The Lorenz pressure broadening of spectral lines is important for the delicate heat balance of the atmosphere. After discussing pressure broadening of absorption lines in infrared, transmission increments at various pressures are calculated and compared with those given by ELSASSER's approximations; the latter overestimate cooling rates. The results are applied to heat transfer by CO_2 (around 15μ) and water vapor in the stratosphere indicating the possibility that the tropopause acts as a heat sink, especially in low latitudes. Neglect of the pressure effect results in underestimating outgoing radiation, e.g. by SIMPSON, and this supports FRITZ's contention that ALDRICH's value of the albedo is too high. Detailed calculation tables are given in an appendix. *Subject Headings:* **1. Atmospheric absorption 2. Radiation calculations.**—*C.E.P.B.*

3.9–122 551.521.31

Kaplan, Lewis D., **On the calculation of atmospheric transmission functions for the infrared.** *Journal of Meteorology*, 9(2):139–144, April **1952.** fig., table, 8 refs., 31 equations. **MH-BH**—The equations of transmission of vertical radiation in a limited range of wave length for a given fraction of absorbing gas, temperature and pressure are set out for an isothermal atmosphere of constant composition and then generalized. A function η is defined and it is shown that variations of this can be taken into account by dividing radiation path into intervals of 100 mb. A constant factor of 1.60 (cf. ELSASSER's 1.66) is deduced to convert beam to diffuse radiation. *Subject Heading:* **1. Radiation calculations.**—*C.E.P.B.*

3.9–123 551.521.3

*London, Julius, **The distribution of radiational temperature change in the Northern Hemisphere during March.** *Journal of Meteorology*, 9(2):145–151, April **1952.** 6 figs., 2 tables, 37 refs., 10 equations. **MH-BH**—Northern Hemisphere zonal pressure, temperature and effective optical depth of water vapor up to 16 km, and amount and type of cloud, are tabulated for March. The infrared radiation flux through each level is calculated and the distribution of radiation cooling in the troposphere is shown by heights and latitude, for clear skies and average cloud. Heating due to absorption of insolation by water vapor is similarly calculated, the difference giving the net cooling. The entire troposphere loses heat by radiation, the maximum (1.5–2°C/day) being at heights of middle clouds (3–4 km). This loss is mostly offset by latent heat of condensation. *Subject Headings:* **1. Radiation balance 2. Northern Hemisphere.**—*C.E.P.B.*

3.9–124 551.521.31:551.501.6:551.588.2:551.584.3

Látal, Arnošt and Látalová, Blanka, **Grafické znázornení oslunění ploch.** [Graphic representation of insolation on surfaces.] *Meteorologické Zprávy*, 4(1–2):42–46, **1950.** figs., tables, 2 refs. **MH-BH**—The intensity of radiation is determined by two groups of factors. The first group includes constant and periodically varying factors such as the inclination and orientation of the surface, the solar constant, the altitude and azimuth of the sun and the thickness of the atmosphere. The second group includes irregularly varying factors such as atmospheric humidity, the quantity of carbon dioxide, cloudiness and the duration of sunshine determined by same, and air pollution. The attached tables give values of incoming calories for surfaces with various inclinations and orientations under ideal atmospheric conditions. A sample map is included to illustrate the practical application of such calculations for various topographic aspects. *Subject Headings:* **1. Radiation 2. Microclimatology 3. Topographic effects 4. Graphical presentation.**—*G.T.*

3.9–125 551.521.32 551.509.532

Brooks, F. A., **Atmospheric radiation and its reflection from the ground.** *Journal of Meteorology*, 9(1):41–52, Feb. **1952.** 12 figs., 13 refs. **MH-BH**—Author discusses atmospheric

transmission at various wave lengths, energy distribution, and absorption by CO_2 and water vapor at 15°C. Results of sky radiation observations in cP air at Harvard in conjunction with slow radiosonde ascents are described and an integration chart for radiation frost problems constructed. Incoming radiation from the air is analyzed into block spectral bands. The spectral reflectivity of sandy loam (about 30%) is examined and the upward radiation flux through a given plane above the ground represented by a diagram; quantitatively the problem is complex. A radiometer (GIER and DUNKLE, 1951) for measuring total outgoing radiation is described; it should be useful in frost forecasting. *Subject Headings:* **1. Atmospheric radiation 2. Terrestrial radiation 3. Frost forecasting 4. Radiometers.** *-C.E.P.B.*

3.9–126 551.521.32

Dirmhirm, Inge and Sauberer, Franz, **Die Bedeutung der diffusen Himmelsstrahlung im Bauwesen. II. Teil: Abgeschirmter Horizont.** [The importance of diffuse sky radiation in buildings. II. Obscured horizon.] *Wetter und Leben*, 3(9–10):222–226, Nov. **1951.** fig., 3 tables. **DWB**—A procedure for calculating the incidence of sky radiation upon vertical surfaces in case of an obscured horizon is presented. Calculated tables giving: 1) daily totals of sky radiation in cal/cm² incident upon south, east, west and north walls with different amounts of obscuration of the horizon on cloudless days, 2) daily total of sky radiation in cal/cm² incident upon north walls with different amounts of obscuration of the horizon for the case in which the obscuring objects are in the shadow and 3) daily totals of incident radiation in cal/cm² with different degrees of obscuration of horizon in the case of complete overcast. *Subject Headings:* **1. Diffuse radiation 2. Radiation on vertical surfaces 3. Solar radiation calculations 4. Obscured horizons 5. Indoor climates.**—*I.L.D.*

3.9–127 551.521.6:523.77

Wild, J. P., **Observations of the spectrum of high-intensity solar radiation at metre wavelengths. III. Isolated bursts.** *Australian Journal of Scientific Research, Ser. A, Physical Sciences*, 3(4):541–557, Dec. **1950.** 7 figs., 4 plates, table, 12 refs., equations. **DLC**—Elaborate colored graphs show the time-intensity relationships of solar radiation "bursts" of various frequencies between 70 and 130 mc/sec in support of article which gives a thorough analysis of observations made at Sydney, Australia, during June 1949. Thirty-two isolated bursts were recorded in 264 hours of observation and 3 types of bursts defined; energy spectra are given for 4 isolated bursts, and a good correlation shown between frequency and energy distribution. *Subject Headings:* **1. Solar radiation 2. Solar bursts 3. Radio frequency radiation 4. Solar spectrum.**—*M.R.*

AIR TEMPERATURE

(*See also items:* 3.9–111, –135, –149, –156, –240)

3.9–128 551.524.1:551.588.2(436)

Morawetz, Sieghard, **Kleinklimatische Beobachtungen in der Weststeiermark bei St. Stefan ob Stainz.** [Microclimatic observations in West Styria at St. Stefan above Stainz.] *Angewandte Meteorologie*, 1(5):146–150, May **1952.** 2 tables. **DWB**—The climate of the Styrian mountain slopes is favorable. Temperature readings 1.5 m above ground at 4 points from valley floor (425 m) to summit (490 m) 5 times daily Aug. 21–30 and Sept. 6–10, 1951, show warmest climate on middle slopes (465 m) and coldest on valley floor. Temperatures 2 cm above ground are also discussed. *Subject Headings:* **1. Temperature microvariations 2. Topographic effects 3. Styria, Austria.**—*C.E.P.B.*

3.9–129 551.524.36:551.510.5

Durward, J., **Abrupt seasonal temperature changes at the tropopause and at the surface at Habbaniya.** *Meteorological Magazine*, London, 81(959):149–150, May **1952.** fig. **MH-BH**—DURWARD describes falls of surface maximum temperature at Habbaniya by up to 20°F about the dates quoted by DEWAR for fall of stratosphere temperature (*see MAB* No. 3.3–87, March 1952). DEWAR gives further details. *Subject Headings:* **1. Maximum temperatures 2. Tropopause 3. Habbanyi, Iraq. I. Dewar, D.**—*C.E.P.B.*

3.9–130 551.524.37

Lawrence, E. N., **Estimation of weekly frost risk using weekly minimum temperatures.** *Meteorological Magazine*, London, 81(959):137–141, May **1952.** 3 figs., 3 refs. **MH-BH**—The method is based on the average daily minimum temperature for each week and the "spread coefficient" or difference between average and extreme minima. The latter can be estimated from the site. Curves for estimating the number of nights per week with temperatures below 32, 30 and 28°F are given. *Subject Heading:* **1. Frost frequencies.**—*C.E.P.B.*

3.9–131 551.524.37

*Lawrence, E. N., **Frost investigation.** *Meteorological Magazine*, London, 81(957):65–74, March **1952.** 3 figs., 8 tables. **DWB**—Statistics of wind frosts (wind at 33 ft exceeds 7½ mph) and radiation air frosts (wind below 7½ mph) of various intensities are compiled for 1921–50 for the Fenland district and in the Lower Severn basin. Effect of time of observation, prevailing wind, orography, soil and heights above M.S.L. are discussed. Frequency F is expressed as log $F=A+BT+Cx-Dt$ where A, B, C, D are constants, T is threshold temperature, x is distance from sea in miles and t is date in weeks after April 1; e.g., for flat clay soil if $T=30.5$, log $F=5.55+0.18T+0.015x-0.15t$. *Subject Headings:* **1. Frost frequencies 2. Radiation frost 3. England.**—*C.E.P.B.*

3.9–132 551.524.5:551.510.42

Fleagle, Robert G., Parrott, William H. and Barad, M. L., **Theory and effects of vertical temperature distribution in turbid air.** *Journal of Meteorology*, 9(1):53–60, Feb. **1952.** 6 figs., table, 14 refs., 31 equations. **MH-BH**—Development of vertical stability at right after a thin layer appears near the ground is calculated. Absorption of infrared radiation causes instability, which extends to the ground, below the layer. Within a thick absorptive fog layer the temperature distribution tends to become unstable, with stable air above. These results were confirmed by meteorograph and tower observations up to 400 ft at Washington before and during radiation fog. In such conditions stack effluents emitted into the fog layer readily reach the ground while upward diffusion is checked. *Subject Headings:* **1. Atmospheric pollution 2. Vertical temperature gradient.**—*C.E.P.B.*

3.9–133 551.524.7(431/5)

Herath, Friedrich, **Studie über interdiurne Temperaturänderungen in der freien Atmosphäre über Mitteleuropa nach Registrierballonaufstiegen in Lindenberg und München.** [A study on the interdiurnal temperature changes in the free atmosphere over central Europe based on recording balloon ascents in Lindenberg and Munich.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 25, **1951.** 14 p. tables, charts, refs. In German, English summary p. 14. Price: DM 1.40. **DWB** A statistical analysis of the seasonal vertical distribution of interdiurnal temperature and lapse rate changes shows that there is a maximum frequency of large changes in both the extreme upper and extreme lower troposphere but the most extreme changes occur in the region of the tropopause. Thirty years (1906–35) of soundings up to 15 km made at Lindenberg and Munich were used. Separation of data for temperature rises from those for temperature falls shows no significant difference. Seasonally, mid-winter and April show biggest changes. *Subject Headings:* **1. Interdiurnal temperature variations 2. Upper air climatology 3. Lindenberg, Germany 4. Munich, Germany.**—*M.R.*

SOIL TEMPERATURE

(*See also item:* 3.9–14)

3.9–134 551.525.2

Dirmhirn, Inge, **Registrierungen der Temperatur der Bodenoberfläche an der Zentralanstalt für Meteorologie und Geodynamik, Wien.** [Records of temperature of ground surface at the Central Institute for Meteorology and Geodynamics, Vienna.] *Austria. Zentralanstalt für Meteorologie und Geodynamik, Jahrbuch*, v. 87, Abhang 6:D45–51, **1950.** 6 figs., 7 tables. **DWB**—Summarizes results of hourly temperatures from a distant reading mercury thermograph of 20 mm diameter 2/3 embedded in bare ground, taken to represent soil temperature at 1 cm depth, mean daily variation ground air (screen) and mean extremes (all days and cloudless days). *Subject Headings:* **1. Soil temperatures 2. Vienna, Austria.**—*C.E.P.B.*

3.9–135 551.525.2:551.524.4

Laĭkhtman, D. L., **O vychisleniiakh teplootdachi pochvy.** [The calculations of heat loss from the soil.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, No. 22(84):52–54, 1950. fig., table, 4 equations. **DLC**—Two methods for calculating the heat flow in the soil are presented and the equations are developed—one method depends upon the use of extreme points in the vertical profile of temperature, for example, after sunset there is a negative balance of temperature at the surface of the soil while at some level in the atmosphere the temperature has a maximum value. The other method depends upon a given initial distribution of temperature and temporal changes at one level. *Subject Headings:* **1. Heat conductivity of soil 2. Vertical temperature gradient 3. Heat balance 4. Soil surface temperatures.**—*I.L.D.*

3.9–136 551.525.2

Tseitin, G. KH., **O novom metode vychisleniia koefitsienta teploprovodnosti pochvy.** [A new method for calculating the coefficient of heat conductivity in the soil.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, No. 22(84):26–33, 1950. 6 figs., table, 4 refs., 6 equations. **DLC**—The formulas for calculating the heat conductivity of the soil, developed by Laĭkhtman, which are not based upon the assumption that the temperature of the soil surface is a simple sine function but rather upon the actual distribution of temperatures are analyzed critically, and the errors resulting from their use are pointed out. Author then develops a formula for calculating heat conduction in the soil which is free of errors and which is based upon extreme values in the distribution of temperature with depth. The expression derived is:

$$k=\frac{\int_0^{u(H(0))}[T(u,t)-T(u,0)]du+\int_{u(H(0))}^{u(H(t))}[T(u,t)-T(u,t_m(u))]du}{\int_0^t[T(h,t)-T(H(t);t)]dt}$$

(k=coefficient of heat conductivity; H=fixed depth; u=a function of depth). Values of the heat conductivity of the soil calculated by the formula for Tiflis for July 1888 are given in a table. *Subject Headings:* **1. Soil temperatures 2. Heat conductivity of soil 3. Heat exchange.**—*I.L.D.*

3.9–137 551.525.31:551.521.31:551.576.31

Dirmhirn, Inge, **Tagesschwankung der Bodentemperatur, Sonnenscheindauer und Bewölkung.** [Diurnal variation of soil temperature, sunshine duration and cloudiness.] *Wetter und Leben*, 3(9–10):216–219, Nov. 1951. 2 figs., 2 tables, refs. **DWB**—The extent to which temperature variations in the soil at a depth of 1 cm depend upon variations of global radiation is investigated. The relationship between soil temperature variations and total radiation deviates from a straight line as heat loss from soil by convection is intensified. With the aid of the relationship between sunshine duration and radiation and that between soil temperature variations and global radiation a table is constructed giving the daily mean amplitude of soil temperature for each month of the year corresponding to different degrees of cloudiness. Also a table giving the relationship between soil temperature and sunshine duration for each month is presented. *Subject Headings:* **1. Soil temperatures 2. Radiation variations 3. Sunshine duration 4. Cloudiness 5. Global radiation 6. Diurnal variations 7. Austria.**—*I.L.D.*

3.9–138 551.525.4(47):550.36

Beliakov, M. F., **Geotermicheskie anomalii Dneprovsko-Donetskoĭ vpadiny.** [Geothermal anomalies of the Dnieper-Donets basin.] *Priroda*, Moscow, 40(11):52–53, 1951. **DLC**—Geothermal observations made in the Donets basin show the earth temperatures at the same depth below the surface differ in different parts of this region. At a depth of 1 km the temperature varies between 24° and 40°C but the difference disappears at 500 m. The geological reasons accounting for this difference in vertical temperatures and also for differences

in horizontal geothermal temperatures are presented. *Subject Headings:* **1. Geothermal anomalies 2. Vertical earth temperatures 3. Donets Basin, U.S.S.R.**—*I.L.D.*

3.9–139 551.525.4:551.506.3(46)

*Due Rojo, Antonia, **La temperatura del subsuelo en el Observatorio de Cartuja.** [The temperature of the subsoil at the Cartuja Observatory.] *Urania*, 36(225):49–58, Jan./March, **1951.** 4 figs., table, 2 refs. **DLC**—Mean and extreme monthly soil temperatures from daily readings at depths of 10, 20 and 40 cm for the period 1903–1932 are given in tables and in graphs. For period 1939–1950 the depths reported are 25, 50 and 150 cm. The deviation of the mean monthly temperature of the soil from that of the air for the two periods 1939–1950, and 1903–1932 is shown on separate graphs. A comparison of the soil thermograph with the air thermograph for a 30-day period (June 1950) shows the way the soil temperature at 25 and 50 cm varies with the air temperature. *Subject Headings:* **1. Soil temperatures 2. Cartuja Observatory 3. Granada, Spain.**—*M.R.*

SEA TEMPERATURE

(*See also item:* 3.9–180)

3.9–140 551.526.6

Stommel, Henry and Woodcock, Alfred H., **Diurnal heating of the surface of the Gulf of Mexico in the spring of 1942.** *American Geophysical Union, Transactions*, 32(4):565–571, August **1951.** 5 figs., table, 10 equations. **DWB**—The diurnal temperature changes of the surface layer in the Gulf of Mexico in the spring of 1942 appear to be related quantitatively to the computed net flux of heat at the surface and to the wind velocity, and are greatest on sunny, calm days. The eddy surface is computed by these methods: 1) integrating the measured temperature from the surface to a depth below which the temperature does not change with time, 2) the computed surface flux is used as the known flux at the surface in terms of which the flux at lower levels is calculated, 3) by direct determination from the data of the change of temperature with time and with elevation. *Subject Headings:* **1. Diurnal sea temperature variations 2. Gulf of Mexico.**—*I.L.D.*

3.9–141 551.526.6:551.525.6

Beliakov, M. F., **Temperaturnye izmereniia N. N. Miklukho-Maklaia v Tikhom i Indiĭskom okeanakh.** [Temperature measurements in the Pacific and Indian Oceans by N. N. Miklukho-Maklaĭ.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr.*, No. 2:49–55, **1951.** fig., 9 refs. **DWB**—MIKLUKHO-MAKLAĬ (born 1846, died 1888) spent half of his life on expeditions and took bathy-thermograph observations at many points in the south Atlantic and Pacific and on the coasts of Australia, and compared ocean temperatures with temperatures obtained at similar depths in deep mines and shafts. Map of world shows places where observations were made. Some details of the results of his measurements are cited. *Subject Headings:* **1. Sea temperatures 2. Earth temperatures 3. Biography 4. South Pacific Ocean 5. South Atlantic Ocean. I. Miklukho-Maklaĭ, N. N.**—*M.R.*

3.9–142 551.526.6:551.521

Egorov, N. I., **Raschet teplovogo balansa Krasnogo moria.** [Calculation of the heat balance of the Red Sea.] *Meteorologiia i Gidrologiia*, No. 3:49–56, Nov. **1950.** 5 figs., table, 5 equations. **DLC**—This study demonstrates a procedure for calculating the heat balance of a body of water for which systematic observations on radiation are lacking both for the body of water and for adjoining shores. Global radiation is calculated by the method proposed by V. V. SHULEĬKIN. Effective radiation in a clear sky was calculated by ÅNGSTRÖM's formula, heat loss by convection by the formula of SANOĬLENKO and heat loss by evaporation by the formula of SHULEĬKIN. It is found that 89 to 91% of possible radiant heat reaches the Red Sea; the loss of heat by reflection and by exchange with the atmosphere is slight, most heat is lost by evaporation and by outgoing radiation; evaporation amounts to 2.3 m per year. *Subject Headings:* **1. Heat balance 2. Radiation 3. Evaporation 4. Red Sea.**—*I.L.D.*

3.9–143 551.526.6:551.577.37/8

Lee, John, **Sea surface temperature and floods and droughts in China.** *Chinese Geophysical Society, Journal,* 2(2):169–189, Dec. **1950.** 2 tables, 17 diagrs., 17 refs. In English, Chinese summary p. 169. **MH-BH**—Sea surface temperatures are graphed 1929–1937 at 22 points and classified into 3 types —1) north cool and south warm water, associated with heavy rains; 2) cool water type (drought in China) and 3) warm water type (variable rainfall). Charts of pressure, air temperature and rainfall departures in July of different years shown. *Subject Headings:* **1. Sea temperatures 2. Rainfall variations 3. China.**—*C.E.P.B.*

3.9–144 551.556:551.526.6

Richter, Johann, **Über den Zusammenhang zwischen Windstärke und Wassertemperatur in der Nordsee.** [On the relation between wind strength and water temperature in the North Sea.] *Annalen der Meteorologie,* 4(7/9):375–379, **1951.** 4 figs., 2 tables, 3 refs. German and English summaries p. 375. **DWB**—Mean temperatures at Horns Rev Lightship 1921–35 at 0–30 m depth show a marked decrease with depth in May–July, due to insolation; in other months a slight increase. Even in summer, but much more in winter, there is some mixing of surface and lower layers, attributed to breaking waves and currents caused by storms. Examples of day-to-day variation of sea surface and air temperatures and wind direction and speed illustrate this. *Subject Headings:* **1. Sea temperatures 2. Wind effects 3. North Sea.**—*C.E.P.B.*

3.9–145 551.526.8

Liser, I. IA., **O nabliudeniiakh nad temperaturoĭ vody rek.** [On the observations of the temperature of river water.] *Meteorologiia i Gidrologiia,* No. 2:57, Oct. **1950.** table. **DLC**—Some critical remarks on the observations of temperature regime of rivers. The best results were obtained from observations at distances of 100–200 m from the river bank with thermometers placed at depths as low as 1–2 m. The experimental observations on the Yeniseĭ River during the period of 1949 showed a difference of 3°C between the temperature near the bank and that at a distance of 200 m from the bank. *Subject Headings:* **1. River temperatures 2. Yeniseĭ River, U.S.S.R.**—*N.T.Z.*

3.9–146 551.526.8:551.508.26

Sauberer, Franz, **Registrierungen der Temperatur der Fliessgewässer.** [Recording the temperature of running water.] *Wetter und Leben,* 3(9–10):213–216, Nov. **1951.** 2 figs., refs. **DWB**—The author describes the use of a water thermograph for obtaining continuous records of water temperature. The apparatus, which consists of an ordinary thermograph to which a Bourdon tube is attached, is placed on a raft. Temperature records made on sunny days in February and August are shown and their dependence upon radiation balance is discussed. A diagram of the apparatus is given. *Subject Headings:* **1. Water temperatures , Bourdon tube 3. Thermographs.**—*I.L.D.*

3.9–147 551.526.831(436)

*Eckel, O., **Über die interdiurne Veränderlichkeit der Fluss- und Seeoberflächen-temeraturen.** [The interdiurnal variability of temperatures of river and lake surfaces.] *Wetter nd Leben,* 3(9–10):203–212, Nov. **1951.** 3 figs., 3 tables, 12 refs. **DWB**—The interdiurnal ariability of the surface temperatures of 34 lakes and rivers in Austria on the basis of a ten ear daily record of 7–8 o'clock temperatures and a table giving the mean interdiurnal vari- bility of the surface temperatures for each month are presented. The mean interdiurnal ariability of the surface temperatures ranges between 0.2 and 0.7°C for individual years with onsiderable scattering. Lake surfaces show a marked summer maximum and winter mini- um; the rivers show maximum values between spring and summer and minimum values in inter. The characteristics of the surface temperature are explained qualitatively by the heat xchange (global radiation) and water drainage regimes. Also the variability of the noon nd afternoon temperatures is examined, but their amplitudes are smaller than that of the orning temperatures. *Subject Headings:* **1. Lake temperatures 2. River temperatures . Interdiurnal temperature variations 4. Radiation effects 5. Austria.**—*I.L.D.*

ATMOSPHERIC PRESSURE AND WIND

PRESSURE

(*See also items* 3.9–121, –169)

3.9–148 551.54.550

Szeva, Edward. O dominemanej zależności wstrząsów górniczych od zmian ciśnienia atmosferycznego. [Hypothetical dependence of mine tremors upon variations of atmospheric pressure.] *Rocznik Polsk. Towar. Geol. Sprawozd. Zjednoczone. Rocznik.* No. 1.55–61. [19] graph. tables, refs. DWB—According to K. Mazurek there is an obvious course of diurnal and annual variation in the frequency of local seismic tremors in Upper Silesia. Data for these are compared with mean daily pressure variations at Kraków and at Katowice. A correlation coefficient of 0.88±0.073 in the first case and of 0.70±0.10 in the second case was obtained. *Subject Headings*: 1. Seismology 2. Atmospheric pressure 3. Silesia, Poland. I. Warsaw, Państwowy Instytut Geologiczny.—*A.M.P.*

3.9–149 551.543.1:551.521

Jacchia, Luigi G. and Kopal, Zdeněk. Atmospheric oscillations and the temperature profile of the upper atmosphere. *Journal of Meteorology*, 9:115–18, Feb. 1952. 4 fig. 9 tables, 17 refs. 28 equations. MH-BH—The fundamental equations of resonance of the atmospheric tides are set up and difficulties of application discussed. Numerical and graphical integration was carried out for a number of temperature profiles up to 150 km. Neither the standard NACA nor the V2 profile gave large enough semidiurnal oscillations, but a satisfactory profile [N] was found giving suitable pressure oscillations of 12 and 12 hours (maxima 353°K at 50–52 km and above 284° above 120 km, minima 217° at 34–38 km and 197° at 82–84 km). Surface oscillations are very sensitive to a change in the 80 km maximum, less so in the 50 km minimum and very little to changes above 90 km. *Subject Headings*: 1. Semidiurnal pressure variations 2. Temperature profiles 3. Upper atmosphere.—*C.E.P.B.*

3.9–150 551.543.5.551

Craig, Richard A. Surface-pressure variations following geomagnetically disturbed and geomagnetically quiet days. *Journal of Meteorology*, 9:21–28, April 1952. 10 fig. 14 tables, 7 refs., 4 equations. MH-BH—Surface pressure variations 0–10 days after a magnetically disturbed (D) and quiet (Q) days are studied on lines of E. and C. Europe, whole Northern Hemisphere for 3 periods of 8 years each. There was no correlation between the two periods but significant negative correlations between successive differences D and Q. The Distribution of Differences D − Q is plotted for each day and shows a transition to a normal curve with 0.8 more days at D than after a Q day. Closer correlations with *Subject Headings*: 1. Geomagnetic disturbances 2. Pressure fluctuations.—*C.E.P.B.*

WIND

(*See also items* 3.9–115, –168, –181)

3.9–151 551.551:551.574.1 551.

Jung, Christian. Anstausch und grossräumige Verbalverteilung von Luftbeimengungen. [Exchange and large scale vertical distribution of admixtures.] *Archiv der Meteorologie*, 4.7:161–192, 1951. 8 figs. 4 tables, 16 refs. German and English summaries. DWB—Assuming a steady supply of small particles into the air near Europe and the ocean continents, the vertical distribution of particles is calculated and compared with measurements up to +4 km msl with potential gradient. Particles are removed at wind speed and exchanged below and above inversions. It is concluded that in 1–4 km periods are mostly of European origin above that non-European. Particularly all aerosols over large oceans are of continental origin, and change in height distribution above supply areas is interesting. Author discusses on similar lines distribution of ozone originating in the stratosphere and finds expected results. *Subject Headings*: 1. Aerosols 2. Austausch 3. Ozone distribution.—*C.E.P.B.*

3.9-152 551.551:551.511

Kleinschmidt, E., Über die Verwendung von Turbulenzkarten zur Ergänzung von Druckmittelkarten. [On the use of turbulence charts to supplement mean pressure charts.] *Zeitschrift für Meteorologie*, 6 (1):79–82. March 1952. 12 figs., 3 refs. MH-BH—Large scale turbulent exchanges are important supplements to mean pressure charts by showing degree of mixing. This is illustrated by charts of Europe for selected mild and cold winters, and the months preceding them, showing isolines of mean pressure and of zonal and meridional austausch. *Subject Headings:* 1. Austausch 2. Turbulent diffusion.—*C.E.P.B.*

3.9-153 551.552(52)

Miyake, T. Wind direction at Naze. *Journal of Meteorological Research*, Tokyo, 12 (12):490 Dec. 1950. 11 tables. In Japanese, English summary p. 512. DWB—A study of the effect of topography upon wind direction at Naze and a comparison of wind direction with cloud direction. *Subject Headings:* 1. Wind direction 2. Topographic effects 3. Naze, Japan.—*I.L.D.*

3.9-154 551.552:581.055(43)

Weinhart, W. Die Baumneigung als Hilfsmittel zur geographischen Bestimmung der klimatischen Windverhältnisse. Dargestellt am Beispiel der Köln-Bonner Bucht. [The inclination of trees as an aid to geographical determination of the climatic wind conditions. Illustrated by the example of the Cologne-Bonn stretch.] *Erdkunde*, Bonn, 5 (3):221–227, 1951. 2 figs., table, 15 refs. DLC—Examination of 160 lime trees and 170 poplars showed that, omitting aberrant values, inclinations of trunks were normally distributed about means with σ 8–9°. Mean inclinations of a large number of groups of trees in Rhine valley indicated prevailing W winds, becoming WSW only near Rhine itself. This is attributed to frequent E winds (an extension of mountain winds) in addition to prevailing W wind. Results are compared with resultants of observed winds at a few stations; differences attributed to greater force of summer winds (trees in leaf) and to inadequacy of Beaufort force. *Subject Headings:* 1. Wind computation 2. Tree inclination 3. Rhine Valley.—*C.E.P.B.*

3.9-155 551.553.1

Kleinschmidt, Ernst sen., Über den Tagesgang des Windes. 3 Mitt. [On the diurnal variation of wind. Pt. 3.] *Annalen der Meteorologie*, 4 (7/9):336–357. 1951. 18 figs., 2 tables, 19 refs. German and English summaries p. 336. DWB—Parts 1–2 appeared in *Annalen der Meteorologie*, 1948. Here the diurnal variation of convection is shown by vector ellipses of harmonic variation of wind components and calculated values given for 5 plains stations in Europe, Eiffel Tower and Säntis. A "hysteresis" (lag) effect is examined. In Pt. B the diurnal variations of gradient and air transport are examined, including effects of ground friction, land and sea breezes, valley winds and superposition of two wind systems; harmonic coefficients of 11 examples from different parts of the world are discussed. Summer wind variation in south and central Europe is examined. The aphorism "The wind shifts with the sun" is shown to be misleading. *Subject Headings:* 1. Diurnal wind variations 2. Vectors.—*C.E.P.B.*

3.9-156 551.554:551.524.4

Gordon, A. H., Angle of deviation between the winds at 50 ft. and 2,000 ft. over the North Atlantic Ocean. *Meteorological Magazine*, London, 81 (956):59. Feb. 1952. table, ref. DWB—Table shows mean wind veer, 50 to 2,000 ft. at JIG and ITEM, from 17° 2000 ft with inversion decreasing to 7° with temperature lapse exceeding 10° 2000 ft (superadiabatic). *Subject Headings:* 1. Wind shear 2. Vertical temperature gradient 3. North Atlantic Ocean.—*C.E.P.B.*

3.9-157 551.555.3

McCaffery, W. D. S., Föhn effect over Scotland. *Meteorological Magazine*, London, 81 (959):151–152, May, 1952. 2 figs. MH-BH—On Jan. 25, 1952, air travelled from Leuchars 75 miles NNW to Kinloss in 6 hrs. crossing Cairngorms at 3500 ft. Temperature rose from 33 to 55°F and dew point fell from 28 to 18°F. Tephigram given. *Subject Headings:* 1. Föhn winds 2. Scotland.—*C.E.P.B.*

3.9–158 551.555.4(262)

Rodewald, Martin, **Die Mistral-Schleuse.** [The mistral outlet.] *Wetterlotse*, Hamburg, No. 28/29:1–3, Oct. **1951.** 2 figs. **DWB**—The mistral extends a long way S and E over the Mediterranean to the Straits of Sicily, with sharp boundaries (chart). On April 2, 1943, NW wind (force 10) blew in S.W. Sardinia with calms on N. and E. *Subject Heading:* **1. Mistral.**—*C.E.P.B.*

3.9–159 551.555.4

Rodewald, Martin, **Von der Bora und verwandten Erscheinungen.** [On the bora and associated phenomena.] *Wetterlotse*, Hamburg, 37:39–45, March **1952.** 3 figs., 2 tables. **DWB**—General description of the bora as a cold, descending wind, with composite pressure chart for Europe 1 day before and temperature 1 day before to 1 day after, and tables of wind speed and direction at Trieste. *Subject Heading:* **1. Bora.**—*C.E.P.B.*

3.9–160 551.555.4:533.6 551.515.811

Teichert, F. and Greifenhagen, B., **Demonstrationsversuche mit strömender Kaltluft.** [Experimental demonstration with flowing cold air.] *Zeitschrift für Meteorologie*, 6(4):122–126, April **1952.** 20 figs. **MH-BH**—When liquid air is set free, the flow of the air chilled by it is made visible by fog. This was used to demonstrate flow of cold air over models. A cold front was simulated by suddenly releasing a mass of cold air, and showed a well developed whirl with horizontal axis. Passage of cold air over or through a mountain range and past small obstacles also illustrated. Construction and lighting of models described and 20 photos shown. *Subject Headings:* **1. Air drainage 2. Cold fronts 3. Katabatic winds.**—*C.E.P.B.*

3.9–161 551.555.8

Rodewald, Martin, **Staubsturm am Suez-Kanal.** [Dust storm on the Suez Canal.] *Wetterlotse*, Hamburg, 39:73–74, April **1952.** **DWB**—March 14, 1952, wind increased to force 6–7 from 150°, and dust drift reduced visibility to 1000 m in Canal and 200 m at Ismailia. Cause was a deep secondary depression on the cold front of a Greek depression. *Subject Headings:* **1. Dust storms 2. Suez Canal.**—*C.E.P.B.*

WIND EFFECTS

(*See also items:* 3.9–45, –69, –91, –116, –144, –240)

3.9–162 551.556:69

Gandin, L. S., **O modelirovanii vetrovykh nagruzok na stroitel'nye sooruzheniia.** [Experimental models of wind load upon structures.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, No. 23(85):15–27, **1951.** 10 figs., 11 refs., equations. **DLC**—An attempt to apply aerodynamic principles to an analysis of wind load upon structures. The author analyzes the air flow around a plane surface at different angles, the distribution of external pressure upon the cross section of a model of a hangar, the transfer of experimental model results to actual structures, the influence of openings in buildings upon the distribution of total pressure and the effect of barriers upon wind load. The discussion is theoretical. *Subject Headings:* **1. Wind load on structures 2. Wind pressure 3. Wind structure 4. U.S.S.R.**—*I.L.D.*

3.9–163 551.556:69:551.554

Gandin, L. S., **Problema vetrovykh nagruzok na stroitel'nye sooruzheniia kak zadacha prikladnoĭ meteorologii.** [The problem of wind load upon structures as a task of applied meteorology.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, No. 23(85):3–14, **1951.** fig., 12 refs., 5 equations. **DLC**—The author shows that the damage inflicted by winds upon structures is not the result of changes in wind load caused by sudden changes in barometric pressure but of changes of wind load depending upon the maximum wind speed, direction and structure of the wind. For high buildings, the change of wind load with elevation must be considered and the following formula is suggested $\frac{q}{q_1} = \ln^2 \frac{z}{z_1} \Big/ \ln^2 \frac{z_1}{z_0}$. The problems

of determining the wind profile of the resonance of structures and the regional distribution of maximum wind velocity in the U.S.S.R. are considered. *Subject Headings:* **1. Wind load on structures 2. Wind pressure 3. Gusts 4. Wind structure 5. Applied meteorology 6. U.S.S.R.**—*I.L.D.*

3.9–164 551.556:551.465:551.509.39

U. S. Hydrographic Office, **Techniques for forecasting wind waves and swell.** Washington, D. C., 1951. 37 p. figs., 10 plates (2 fold.), tables, refs. *H.O. Pub.* No. 604. **DWB**—Manual dealing with the generation of waves by wind and with the travel of waves in deep water after they have left the regions of strong winds. Methods are described for determining the characteristics of wind waves by means of data from adequate, consecutive synoptic weather maps and for forecasting swell off coasts. Energy transfer from wind to waves and the relationships between waves and the three variables, wind velocity, duration, and fetch are discussed. *Subject Headings:* **1. Wind wave forecasting 2. Swell 3. Wave forecasting 4. Ocean-atmosphere interaction.**—*M.P.K.*

3.9–165 551.557.3:551.510.535

Phillips, G. J., **Measurement of winds in the ionosphere.** *Journal of Atmospheric and Terrestrial Physics*, London, 2(3):141–154, 1952. 8 figs., 17 refs. **DWB**—A sender at Cambridge, England, emitting 50 pulses/sec on 2.4 Mc/s was used with 4 receiving aerials 130–260 m apart and movements of diffraction pattern recorded. These are considered to show air motion at 100–120 km height. Diurnal variations are shown for each month Feb. 1949–June 1951 and harmonic components plotted on dials. They partly represent a solar tide with amplitude 16 m/s. The most frequent velocities were 50–100 m/s in summer, 60–120 in winter; in magnetic storms very high speeds from E. were found. Monthly resultants very scattered, with means around 40 m/s from W in May–Aug., 30 m/s from ENE in other seasons. *Subject Headings:* **1. Ionospheric winds 2. Wind measurement 3. Wind frequencies 4. Cambridge, England.**—*C.E.P.B.*

3.9–166 551.558.21:551.510.53:797.5

Bangs, Scholer, **To the stratosphere in a glider.** *Saturday Evening Post*, 224(8):32–33, 94, 96, 100, Aug. 25, 1951. photos. **DWB**—Popular article on glider flights based on vertical motion of Sierra Wave at Bishop, California. Reference is made to the Sierra Wave Project sponsored by several agencies, which is expected to prove that altimeters give false readings from several hundred to several thousand feet. A participant of the project, Bob Symons, is quoted as believing gliders will prove superior tools to both airplanes and balloons in meteorological research. *Subject Headings:* **1. Gliders 2. Gliding 3. Sierra Wave 4. Instrumental errors 5. Sierra Wave Project 6. Bishop, Calif.**—*G.T.*

3.9–167 551.558.21:797.5

Fyfe, A. J., **Lee-waves of the Ochils.** *Weather*, 7(5):137–139, May 1952. 3 figs. **DWB**—Describes a glider ascent to 10,000 ft, the lift being provided by lee-wave from Ochil Hills (Scotland) only 800 ft above surrounding country. *Subject Headings:* **1. Lee waves 2. Gliding. 3. Ochil Hills, Scotland.**—*C.E.P.B.*

3.9–168 551.558.21:551.511

Jacoby, Bill, **A vortex possibility of the Sierra wave.** *Soaring*, Memphis, Tenn., 15(2):11, March–April, 1951. **DWB**—The author assumes that the flow of air across the Sierra is from west to east and that the general air mass has a temperature inversion that makes its lower layer very stable. Wave formation occurs when air, which spills over the passes with high velocity, is trapped, and then stagnant air interacts with high velocity cold air. The wave is composed of several primary vortexes and their accompanying obstruction waves. *Subject Headings:* **1. Vortexes 2. Lee waves 3. Sierra Mountains.**—*I.L.D.*

3.9–169 551.558.21:551.547.1:629.13

French, George M. (*CAA, Washington, D. C.*), **Mountain winds and their effects on flight.** *U. S. Civil Aeronautics Board. Bureau of Safety Investigation, Safety Bulletin*, 186–51, July

12, 1951. 14 p. refs. **DLC**—A brief manual for pilots and operations personnel giving the present status of knowledge regarding wind flow and pressure patterns in the lee of high mountains. An analysis was made of all accidents which occurred in mountains during the period 1938–1949 to determine whether or not altimeter errors or wind conditions caused by the lee eddies could have been responsible. Only 4 cases occurred in the lee of mountains when winds were over 25 mph. The "Sierra Wave Project" to study lee effects in Bishops Valley, Calif. is described. *Subject Headings:* **1. Lee effects 2. Altimeter errors 3. Aeronautical meteorology 4. Mountain winds 5. Sierra Wave Project.**—*M.R.*

3.9–170 551.558.21:551.588.21:797.5

Seeking St. Auban's standing wave. *Flight*, London, 60(2233):593–596, Nov. 9, 1951. 10 figs. **DLC**—Detailed account of the Royal Air Force Gliding Association's expedition to Saint Auban-sur-Durance in the Lower Alps of France, in March 1951. Soaring, based on standing waves resulting from a strong wind intercepted by the Lure Mountain and the Penitents Slope, is described and several meteorological features mentioned. Pictures show members and equipment of the expedition, orographic characteristics of the region and a lenticular cloud which formed while the wave was active. *Subject Headings:* **1. Gliding 2. Standing waves 3. Lee waves 4. Saint Auban-sur-Durance, France.**—*G.T.*

3.9–171 551.558.21

Vertical air motion over northern England and southern Scotland November 27, 1951. *Meteorological Magazine*, London, 81(959):153–154, May, 1952. 3 refs. **MH-BH**—Aircraft at 13,000 ft experienced up-currents of about 750 ft/min and down currents of 400–500 ft/min probably due to lee waves over the mountains. *Subject Heading:* **1. Vertical currents.**—*C.E.P.B.*

AQUEOUS VAPOR AND HYDROMETEORS

HUMIDITY AND EVAPORATION

(*See also items:* 3.9–62, –151)

3.9–172 551.571.36(68)

Drummond, A. J., **Extremely low relative humidity over the Central Transvaal.** *Weather*, 7(4):107–110, April 1952. 2 figs., table. **DWB**—At Pretoria, Sept. 22–23, 1951, relative humidity was below 22% for 34 hours. Attributed to subsiding air moving from SW from a high off Cape Town. *Subject Headings:* **1. Humidity extremes 2. Transvaal.**—*C.E.P.B.*

3.9–173 551.571.4(26)

Tunnell, G. A., **Vapour pressure over the sea.** *Meteorological Magazine*, London, 81(957):677–79, March 1952. table, 2 refs. **DWB**—An analysis of correlation coefficients between vapor pressure in screen on board ship and saturation pressure at sea surface temperature, taking account of difference between air and sea temperature. Based on data from "Carnegie" and "Meteor." *Subject Headings:* **1. Vapor pressure 2. Air-sea temperature difference.**—*C.E.P.B.*

3.9–174 551.571.7:551.577.3(773)

Huff, F. A. and Stout, G. E., **A preliminary study of atmospheric-moisture-precipitation relationships over Illinois.** *American Meteorological Society, Bulletin*, 32(8):295–297, Oct. 1951. 3 tables, 4 refs. **MH-BH**—Rainfall data presented in terms of percentage of total moisture are shown in tables for the years 1946–1948. The moisture flowing into the state (D_t) is calculated by the equation: $D_t = \frac{(t)(v)(b)(w)}{A}$ (t for time, v for velocity of inflow, b for width of state perpendicular to inflow direction, w for depth of precipitable water per unit column air, A for area of state). Attention is given to monthly, seasonal and annual trends of the elements investigated. *Subject Headings:* **1. Water vapor transport 2. Precipitable water 3. Illinois.**—*G.T.*

3.9–175 551.571.2(71):551.586:63(71)

Kirk, D. W., **Moisture regions in the East Kootenay lowlands of British Columbia.** *Scientific Agriculture*, 31(1):15–24, Jan. **1951.** map, diagr., tables, ref. **DLC**—A technique for establishing moisture regions in the East Kootenay lowlands of British Columbia is presented. Seven moisture regions are distinguished by means of THORNTHWAITE's method. A correlation is established between vegetation and summer water deficiency in the vicinity of the seven stations for which climatic data are available. The representative fractions of vegetation cover characteristic of each climatic region are used to map the agricultural suitability of the East Kootenay region. A map of the East Kootenay moisture regions is presented. *Subject Headings:* **1. Climatic classification 2. Agricultural climatology 3. Thornthwaite's classification 4. British Columbia**—*I.L.D.*

3.9–176 551.573

Blaney, Harry F., **Determining evapotranspiration by phreatophytes from climatological data.** *American Geophysical Union, Transactions*, 33(1):61–66, Feb. **1952.** fig., 3 tables, ref. **DWB**—Very little data are available on evapotranspiration by phreatophytes (deep rooted plants) in most parts of the United States. Author uses available climatic data, especially temperature, to illustrate method for daytime hours. With ample water supply the evapotranspiration U for the growing period should be $U = Kt \cdot p/100$; K, variable coefficient; t, mean monthly temperature; p, monthly percent of daytime hours of the year. From the meteorological point of view this empirical formula seems too rough. *Subject Headings:* **1. Evapotranspiration 2. Phreatophytes.**—*A.A.*

3.9–177 551.573:551.579

Croft, A. R., Anderson, H. W. and Storey, T. G., **Report on the Committee on Evaporation and Transpiration.** *American Geophysical Union, Transactions*, 33(1):119–122, Feb. **1952.** 8 refs. **DWB**—Short statements summarize work of members and collaborators: 1) H. W. ANDERSON's and T. G. STOREY's investigations on effect of forest cover and land-use on evaporation and transpiration; 2) HARRY F. BLANEY's formula to determine evapotranspiration by climatic data; 3) E. G. DUNFORD's report on soil moisture under different conditions; 4) R. W. GERDEL's intensive study of influence of micrometeorological phenomena on snow metamorphisms, particularly ablation; 5) JOHN R. MATHER' stests of THORNTHWAITE's evapotranspiration formula and evapo-transpirometer. *Subject Headings:* **1. Evapotranspiration 2. Runoff 3. Soil moisture 4. Ablation. I. Blaney, Harry F. II. Dunford, E. G. III. Gerdel, R. W. IV. Mather, John R.**—*A.A.*

3.9–178 551.573:551.579(931)

Garnier, B. J., **The application of the concept of potential evapotranspiration to moisture problems in New Zealand.** *New Zealand Geographer*, Wellington, 7(1):43–61, April **1951.** 5 figs., 4 tables, refs. **DLC**—Potential evapotranspiration varies slightly from year to year (in New Zealand) as temperatures vary, but such variation is less than that of precipitation so that the former can be used as a more stable index of regional water requirements. A comprehensive analysis of data for all of N. Z. in terms of evapotranspiration and moisture deficiency from region to region is suggested, and sample computations given in tables, graphs and on charts. Effects of altitude, distance from coast, latitude and orography are considered. Areas of slight, moderate and severe moisture deficiency are treated independently. *Subject Headings:* **1. Potential evapotranspiration 2. Moisture deficiency 3. Thornthwaite's classification 4. New Zealand.**—*M.R.*

3.9–179 551.573:551.577(432)

†Rassow, Lothar, **Der effektive Niederschlag in Mitteldeutschland.** [The effective rainfall in Central Germany.] *Angewandte Meteorologie*, 1(4):106–114, Jan. **1952.** 7 figs., 26 refs. **DWB**—Compares various methods for measuring evapotranspiration and adopts formula of LAATSCH (1944) as best, using grass-covered sand as standard. Charts of effective rainfall (rainfall minus evaporation) are constructed for year, April–June and June–Aug., and discussed. Feather grass (*Stipa capillata*) occurs as a steppe relic nearly coinciding with excess evaporation in April–June. *Subject Headings:* **1. Evapotranspiration 2. Effective rainfall.**—*C.E.P.B.*

3.9–180 551.573:551.526

Tverskaia, N. P., **Temperatura ispariaiushchikhsia kapel'.** [Temperature of evaporating drops.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 15(1):74–81, 1951. fig., 6 tables, 4 refs., 3 equations. **DWB**—By assuming that a drop behaves like a psychrometer, the author derives from the psychrometric formula an expression for determining theoretically the temperature of evaporating drops. The expression is $T_d = T_a - A(E_d - e)$; T_d = temperature of the drop; T_a = temperature of the air; E_d = vapor pressure of the drop; e = vapor pressure of the air; A = the psychrometric constant. Value of A was determined experimentally by the use of a special chamber in which the temperature of the drops was measured with a thermocouple attached to a mirror galvanometer. Values for A are determined in moving and in still air and for supercooled and freezing drops. They ranged between 1.7 and 2.1. A nomogram for calculating the temperature of evaporating drops under any atmospheric condition is given. *Subject Headings:* **1. Evaporation of raindrops 2. Raindrop temperature data.**—*I.L.D.*

3.9–181 551.574:551.578.41

Reynolds, S. E., **Ice-crystal growth.** *Journal of Meteorology*, 9(1):36–40, Feb. 1952. 12 figs., table, 4 refs. **MH-BH**—Describes a laboratory study of rate of ice crystal growth in supercooled clouds at −20 to −16°C, seeded with dry ice. Diagrams show frequency distributions of snowflake diameters after 10–165 sec, relations between thickness and density, and growth of mass with time; they agree well with HOUGHTON's calculations. It is considered that a convective cloud might be effectively seeded from ground by a very little silver iodide but overseeding is unlikely. *Subject Headings:* **1. Ice crystal formation 2. Cloud seeding.**—*C.E.P.B.*

3.9–182 551.574.1:06

Byers, Horace R., Anderson, Charles E., Benton, George S. and others, **Report of the Committee on Cloud Physics—1951.** *American Geophysical Union, Transactions*, 32(5):760–764, Oct. 1951. refs. **DWB**—Recent publications on cloud physics and artificial precipitation are reviewed. The section on artificial nucleation includes seven papers by authors such as ANDERSON, VONNEGUT, LANGMUIR, SCHAEFER, HOUGHTON and others. Section on research concerned with Bergeron-Findeisen ice particle theory and source of ice particles in supercooled clouds includes works by BOWEN, HOUGHTON, LUDLAM, LEVINE, WORKMAN, REISS, WOODCOCK, KOHLER and others. *Subject Headings:* **1. Cloud physics research 2. Artificial precipitation 3. A.G.U. Committee on Cloud Physics. I. Braham, Roscoe R., Jr. II. Hall, Ferguson III. Weickmann, Helmut K.**—*G.T.*

3.9–183 551.574.1:551.576.1

Ouchi, Koo, **On the stability of the ice germs in a cloud (fog) particle.** *Tohoku University, Science Reports, 5th Ser., Geophysics*, 2(3):163–166, Dec. 1950. 2 tables, 20 equations. **DWB**—A mathematical study on the subject. This author defines "ice germ" as: "pure ice crystal or the ice-affine (freezing) nucleus covered with thin ice film." Temperature of equilibrium of three phases lies between 0°C and −0.2°C, hence existing ice nuclei (radii larger than 10^{-6} cm) can grow—the cloud droplets freeze—into spheres if the cooling rate is large. If no ice nuclei $>10^{-6}$ cm exist in a cloud, supercooling can easily occur. *Subject Headings:* **1. Condensation nuclei 2. Cloud formation 3. Freezing nuclei 4. Ice nuclei.**—*W. N.*

3.9–184 551.574.1:551.578

†Zamorskiĭ, A. D., **Atmosfernyĭ led.** [Atmospheric ice.] *Priroda*, Moscow, 40(1):24–32, Jan. 1951. 9 figs., table, 30 refs. **DLC**—A popular exposition of the present state of knowledge on ice in the atmosphere. The author presents a new and systematic classification of atmospheric ice (though he himself considers it controversial and not very comprehensive) and discusses the variety of processes of ice formation with emphasis on the significance of supercooled water. The structure and shape of various kinds of atmospheric ice (snow, hail, rime, sleet, frost, surface icing, etc.) are described. The paper contains numerous illustrations and a bibliography of Russian and foreign literature on the subject. *Subject Headings:* **1. Ice crystal formation 2. Condensation nuclei.**—*C.K.*

3.9–185 551.574.42:551.515.12:551.578.45

§Harlin, Ben W. (*U. S. Weather Bureau, Nashville, Tenn.*), **The great southern glaze storm of 1951.** *Weatherwise*, 5(1):10–13, Feb. **1952.** 4 figs. **DWB**—Details are given of the synoptic conditions prevailing during the week of Jan. 28–Feb. 1 and subsequently, when for 10 days there was a great amount of damage and hardship in Tennessee (and for a shorter period in other parts of the south), due to a combination of freezing rain, snow and unusually low temperature. Damage was estimated at $100,000,000—the worst storm in the southern states since Feb. 1899. *Subject Headings:* **1. Glaze storms 2. Cold waves 3. Tennessee.**—*M.R.*

3.9–186 551.575(494)

Bouët, Max., **Le brouillard dans les Alpes valaisannes.** [Fog in the Valais Alps.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 4(1):26–33, **1952.** 6 tables, 3 refs. French, German, English summaries p. 26. **DWB**—Observations of fog from Montana (1500 m) were used to calculate frequency of fog at 1500, 2500, 3500 and 4500 m at 7½, 10½, 13½ and 18 h and days of fog. At these 4 levels mean frequencies were 5, 24, 41, 51% and days 12, 39, 58, 71%, compared with 2% at 500 m. Height frequencies of base of summer cumulus are calculated. Observations are classified into slope fog (30%), stratus fog (14% but persistent), bad weather fog (56%). *Subject Headings:* **1. Fog frequencies 2. Cloud height 3. Valais, Switzerland.**—*C.E.P.B.*

3.9–187 551.575:551.508.25:551.521.61

Sauberer, Franz, **Messungen der Infrarotdurchlässigkeit von Nebel mit Bleisulfid-Photowiderständen.** [Measurements of the infrared transmission of fog with lead sulphide photo-resistances.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 4(1):1–13, **1952.** 6 figs., table, 2 refs. German, English and French summaries p. 1–2. **DWB**—Various types of lead sulphide photo-electric resistances were investigated. All showed good proportionality between applied voltage and sensitiveness and between radiation intensity and resistance; a temperature effect was found with all but those of minimum surface. Spectral sensibility varied between different types. These cells were used to measure transparency of mountain and valley fogs for 1.5, 1.8 and 2.8 mu. Results showed an appreciable decrease of permeability (increase of extinction coefficient) with increasing wave length for the same optical visibility. *Subject Headings:* **1. Infrared spectroscopy 2. Fog.**—*C.E.P.B.*

CLOUD PHYSICS

(See also items: 3.9–137, –183)

3.9–188 551.576.11:551.594.12

Cochet, Robert, **Évolution d'une gouttelette d'eau chargée dans un nuage ou un brouillard à temperature positive.** [Growth of a charged droplet of water in a cloud or in fog at temperatures above freezing.] *Académie des Sciences, Paris, Comptes Rendus*, 233(2):190–192, July 9, **1951.** graph, refs. More detailed articles are included in *Annales de Géophysique*, 8(1):33–54, Jan./March **1952** and *France Centre National de la Recherche Scientifique, Journal des Recherches*, No. 19:172–180, June **1952.** **DWB**—Langmuir (1948) reported on the growth of a noncharged droplet in an ascending air current or in precipitating through a cloud. The author does the same for a charged droplet, as a function of its diameter. Coefficients for both charged and uncharged particles of 5, 10, 20 and 30μ are shown. The charged drop falls 1.55 m while increasing from 30 to 50μ in 28 sec, 14.3 m from 50 to 80μ in 92 sec, 100 m from 80 to 140μ in 400 sec, and thus takes 520 seconds to grow from 30 to 140μ, while a noncharged drop takes 2500 seconds and falls 300 m in growing the same amount. Thus, the smallest possible drop with the largest possible charge is the most efficient in collecting water from a cloud. *Subject Headings:* **1. Cloud physics 2. Drop accretion 3. Charged droplets.**—*M.R.*

3.9–189 551.576.11:551.508.765:535.3

Massachusetts Institute of Technology, **Measurement of drop size distribution and liquid water content of natural clouds.** Contract AF19(122)-245, Quarterly Progress Report No. 4,

May 31, 1951. 31 p. refs. **DWB**—It is shown that when two hydrosols are mixed mechanically the optical properties of the mixture are not identical with those of the two separate hydrosols if the light passes through one and then the other, because in mixing there are some collisions of particles and hence the size distribution of particles is biased toward larger particles (experimentally the mixed population contains 79% of the old population and 21% of an entirely new population). The new distribution decreases the optical density. To test this hypothesis two monodisperse hydrosols were divided each into two equal parts, and one part mixed and the other part combined unmixed with the counterpart of the other hydrosol. Data on the sulphur hydrosol experiments with respect to optical density are presented and will be analyzed in a later report. *Subject Headings:* **1. Drop size distribution measurement 2. Optical density of hydrosols. I. Keily, D. P. II. Contract AF19(122)-245.** —*M.R.*

3.9–190 551.576.11

Sherman, Leon, **A mechanism for producing cloud lines.** *Journal of Meteorology*, 9(2):110–117, April 1952. 13 figs., 9 refs., 15 equations. **MH-BH**—A vector analysis is given of the air motion in a cloud formed by vertical currents, aided by release of latent heat, in a wind field. The resulting changes in the shape of the cloud are discussed. This is applied to cloud models in composite wind fields. Cases pictured are stream line convergence dominating speed divergence and *vice versa*, representing cloud lines formed on upwind side of a channel between mountainous islands, clearing on downwind side. This is confirmed by air photos in Hawaiian Islands. *Subject Headings:* **1. Cloud formations 2. Cloud lanes.**—*C.E.P.B.*

PRECIPITATION

(*See also items:* 3.9–14, –76, –143, –174, –179, –181, –184, –185, –198)

3.9–191 551.577.31:551.553.21

Ramage, C. S., **Diurnal variation of summer rainfall over East China, Korea and Japan.** *Journal of Meteorology*, 9(2):83–86, April 1952. 2 figs., 12 refs. **MH-BH**—Diurnal variations of rainfall in summer monsoon for a number of stations were classed as morning or afternoon maxima, both, or no significant diurnal variation. E. China, Yellow Sea coast and Kyushu have a morning maximum with afternoon maximum also at inland stations and some coast stations. Similar variations elsewhere are compared. After midnight the warm moist turbulent inflow is limited to lower layers with conditionally unstable air above. Rain sets in when Cu clouds break through. The maximum at 15–19 h is the culmination of normal afternoon convection. *Subject Headings:* **1. Diurnal precipitation variations 2. Monsoon rains 3. East Asia.**—*C.E.P.B.*

3.9–192 551.577.37

§Frost, R., **Exceptional rainfall of Trinidad, February 19, 1951.** *Meteorological Magazine*, London, 81(958):107–112, April 1952. 5 figs., 5 refs. **DWB**—At St. Clair 10.92 in. fell in February (normal 1.56 in.), and on N of mountains over 24 in. Mainly due to 3 outbreaks of cold air from N. America behind occlusions or fronts moving SSE. *Subject Headings:* **1. Rainfall extremes 2. Trinidad, B. W. I.**—*C.E.P.B.*

3.9–193 551.577.37(73/9)

*Jennings, Arthur H., **Maximum 24-hour precipitation in the United States.** *U. S. Weather Bureau, Technical Paper* No. 16, Jan. 1952. 284 p. all tables. Price $1.25. **DWB**—Based on data from 7355 U. S. Weather Bureau first-order, cooperative and special stations, for periods of 10 years or more up to the end of 1949 (1505 of the stations were provided with recording gages). The three greatest amounts are tabulated for each of the 48 states (with place and date thereof), with annotations where greater amounts have been recorded at places with less than 10 years of record. Charts show for each month the greatest amount (and place thereof) recorded in each of the 100 odd climatological divisions of the U. S. A. Finally, monthly maximum values are given for each of the stations with 10 years or more of record, length of record and coordinates for each. *Subject Headings:* **1. Maximum precipitation 2. Rainfall extremes 3. Long period records 4. Precipitation charts 5. United States. I. U. S. Weather Bureau II. U. S. Corps of Engineers III. Linsley, R. K.**—*M.R.*

3.9–194 551.578.13

Todd, David K. **On summertime rainfall at New York, N. Y.** *American Geophysical Union. Transactions*, 32(5):701–703, Oct. 1951. fig., 15 refs. DWB—Diurnal variation of precipitation frequency for each of the months: June, July and August is shown on curves representing mean values obtained from records for the 50-year period 1898–1947 at the Central Park, New York Meteorological Observatory; data are given as % frequency of precipitation occurrence compiled on an hourly basis. The monthly curves are compared and found to show very similar shapes, indicating maxima at 07, 17 and 21 h. Author suggests radiational cooling during the night as a probable cause of the morning maximum and insolational heating of the atmosphere in the case of the second maximum. *Subject Headings:* 1. Diurnal rainfall variations 2. Rainfall frequencies 3. New York, N. Y.—*G.T.*

3.9–195 551.578.46:551.578.42(494)

Zingg, Theodor (Eidg. Inst. f. Schnee- und Lawinenforschung, Davos). **Die maximalen Schneelasten und ihre Abhängigkeit von der Meereshöhe.** [Maximum snow accumulation and its dependence on altitude.] *Schweizerische Bauzeitung*, Zurich, 69(45), 1951. 1 p. fig., 3 equations. Abstracted from reprint. DWB—Equations attempting to account for maximum accumulation of snow as a function of altitude above sea level are briefly discussed. A graph is presented in which maximum snow recordings at various Swiss stations since 1864 are shown as a function of the altitudes at which records were obtained. Snow accumulation is expressed in kg m², obtained from an assumed average 300 kg/m³. *Subject Headings:* 1. Snow density 2. Snow distribution 3. Altitudinal influences 4. Switzerland.—*G.T.*

3.9–196 551.578.7(432)

Ortmeyer, W., **Hagelschaden und Hagelverteilung in Sachsen.** [Hail damage and hail distribution in Saxony.] *Angewandte Meteorologie*, 1(5):138–139, May 1952. 2 plates. DWB—The first map shows in great detail the amount of damage by hail per ha., 1924–41. "Streaks" of damage parallel to the Erz Mountains show effect of topography. The second map shows mean number of days of hail, 1885–1913. *Subject Headings:* 1. Hail damage probability 2. Hail distribution 3. Saxony.—*C.E.P.B.*

HYDROMETEOROLOGY

(See also items: 3.9–177, –178)

3.9–197 551.579.1

*Pramanik, S. K. and Rao, K. N., **Average maximum and minimum rainfall and temperature, and runoff based on Khosla's formula, corresponding to maximum rainfall for river catchments in India.** *India. Central Board of Irrigation. Journal*, 7(5):507–522, Sept. 1950. fig., 6 tables. DWB—This work consists mainly of tables, giving the average and extreme monthly and annual rainfalls and temperatures in each of 65 river basins, based on direct means of 1 to 140 stations. Finally, the maximum runoffs in inches and million acre-feet are calculated by Khosla's formula for each basin. *Subject Headings:* 1. Runoff 2. River basins 3. India.—*C.E.P.B.*

3.9–198 551.579.1:551.577.3(969)

*†Wentworth, Chester K., **Geology and ground-water resources of the Honolulu-Pearl Harbor area, Oahu, Hawaii.** Honolulu, Board of Water Supply, 1951. 111 p. 25 figs., 30 plates, map in pocket, 27 tables, 70 refs. DWB—This report contains a detailed discussion of the Honolulu and Pearl Harbor areas with annual rainfall isohyets and rainfall probabilities, evaporation and transpiration, runoff loss to the ocean and change in storage. *Subject Headings:* 1. Ground water storage 2. Rainfall variations 3. Oahu, Hawaiian Islands.—*I.L.D.*

3.9–199 551.579.4(47)

Dzherdzhio, Z. V., **Vydelenie mezhennogo stoka na rekakh Sredneĭ Azii.** [Runoff determination of the interflood periods of the rivers of Central Asia.] *Meteorologiia i Gidrologiia*, No. 2:54–55, Oct. 1950. DLC—The alimentation of the rivers in Central Asia is affected by the thawing of snow and glaciers in the mountain regions. The interflood period is observed

when thawing is absent. The cessation of daily variations of the runoff in this region shows the beginning of the interflood period. *Subject Headings:* **1. Runoff 2. Snow melt 3. Central Asia, U.S.S.R.**—*N.T.Z.*

3.9–200 551.579.4(781)(778)

*U. S. Geological Survey. Water Resources Division, **Kansas-Missouri floods of July 1951.** *U. S. Geological Survey. Water Resources Div., Geological Survey Circular* 1,151, Oct. **1951.** 69 p. graphs, charts, mostly tables. **DWB**—This report contains the following data for each gaging station in eastern Kansas and adjoining Missouri: type and location of gage, size of drainage area, length of record, etc. Tables for each station giving the mean daily discharge from May 2 to July 31, and the stages and discharges at indicated times for each day of the interval July 8–25. The antecedant rainfall conditions of the flood, the general characteristics of the flood and the damage caused are described. *Subject Headings:* **1. Floods 2. Flood intensities 3. Precipitation effects 4. Kansas 5. Missouri. I. Paulsen, C. G. II. Wells, J. V. B.**—*I.L.D.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

(*See also items:* 3.9–3, –34, –37)

3.9–201 551.582:632.7(678)

Burnett, G. F., **Field observations on the behaviour of the red locust (*Nomadacris septemfasciata* Serville) in the solitary phase.** *London. British Museum. Anti-locust Research Center, Anti-locust Bulletin,* 8, **1951.** 36 p. 8 figs., 4 tables, 21 refs. **GB-MO**—Describes observations in the Rukwa Rift Valley, S.W. Tanganyika, Sept. 1948–April 1949. Hoppers tend to move downwind through tall grass. Weather has little influences on copulation. Microclimatic data (daily temperature and humidity cycle) and effect on movements are summarized; locusts avoid sun temperatures over 40°C. Influence of these factors on migration is discussed. *Subject Headings:* **1. Locusts 2. Insect migration 3. Bioclimatology 4. Tanganyika.**—*C.E.P.B.*

3.9–202 551.582(56,612,62):629.12

Great Britain, Hydrographic Dept., **Mediterranean pilot, Vol. 5. Comprising the coasts of Turkey and the island of Cyprus.** 4 ed. London, **1950.** 50+253 p. 31 plates. Meteorology p. xxxvi–l, 16–38. **GB-MO**—P. xxxvi–l form a general introduction on meteorology; p. 16–38 summarizes climate and weather (pressure, wind including local winds, rainfall, fog and visibility, temperature and humidity, sea temperature). Full climatic tables are given for Tripoli (Libya), Bengasi, Alexandria, Port Said, Limassol, Kyrenia, Haifa, Beirut. (*See item* 2E-123, May 1951, *MAB* for abstract of 3rd ed.) *Subject Headings:* **1. Marine climatology 2. Middle East 3. Africa 4. Mediterranean.**—*C.E.P.B.*

3.9–203 551.582(436)

Hillischer, H., **Wien.** [Vienna.] *Leben und Umwelt,* Basel, No. 3:49–58, Dec. **1951.** 3 diagr.—This description of the environs and history of Vienna includes a mention of the climate, with monthly mean temperatures. *Subject Headings:* **1. Urban climates 2. Vienna, Austria.**

3.9–204 551.582.2:551.585.1:551.46(261.2)

*Hamburg. Deutsche Seewarte, **Klimatologie der Nordsee.** [Climatology of the North Sea.] Hamburg, **1938–1939.** 186 p. tables, diagrs., many folded. **DWB**—A heterogeneous but detailed compilation of tables, charts, wind roses, etc. compiled from data observed by merchant ships, lightships, naval vessels, as well as at land stations all over the North Sea and adjacent coasts. The data are essentially: 1) air and water temperatures, 2) frequencies of wind direction and speed, and of gales, 3) frequency of fog, 4) states of sea, 5) visibility, 6) precipitation and 7) icing of airplanes flying over the North Sea. The section on icing of aircraft contains a short textual analysis by Dr. Richard Becker, and monthly charts for

Oct. through March, of areas in or adjacent to the North Sea where icing occurs certain percentages of the time at 500, 750, 1000, 1250, 1500, 1750 or 2000 m. (varies with month). *Subject Headings:* **1. Marine climatology 2. Icing of aircraft 3. Visibility at sea 4. Oceanography 5. North Sea. I. Becker, Richard.**—*M.R.*

3.9–205 551.582.2(52)

Inoue, T., **On the result of observations in Treasury (The Nara National Museum Treasury).** *Journal of Meteorological Research*, Tokyo, 3(6):215–219, March **1951.** 4 figs., tables, equations. In Japanese, English summary p. (14). **DWB**—Temperature, relative humidity and vapor pressure were recorded from January to April 1950 and the data are presented. *Subject Headings:* **1. Fragmentary climatic data 2. Indoor climates 3. Nara National Museum Treasury, Japan.**

3.9–206 551.582.3(26,47)

Isakov, I. S., **Pervyĭ tom morskogo atlasa.** [The first volume of the marine atlas.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr.*, No. 1:72–74, **1951. DWB**—Comments are made on the new Soviet marine atlas which, although its main purpose is to depict ocean and sea regions, shows the whole surface of the earth, land, sea and atmosphere. All names of archipelagos, islands, etc. discovered by and named for Russian explorers are particularly noted. A new classification of ocean bottoms and system of relief coloration for land and ocean regions are added. *Subject Headings:* **1. Marine atlases 2. U.S.S.R.**—*A.M.P.*

3.9–207 551.583.7:525.3

Goguel, Jean, **Les déplacements séculairs du pôle.** [Secular displacements of the pole.] *Annales de Géophysique*, 6(3):139–146, July–Sept. **1950.** 3 figs., French and English summaries p. 139. **MH-BH**—Possible magnitude of polar displacement due to general circulation, ocean currents, tides and the importance for the study of paleoclimatology and paleogeography are presented. The theory is that if the earth were rigid and spherical, there would be a rapid displacement of the pole due to cyclonic winds, currents and tides, but if the earth were flattened at the poles and rigid, the displacement would amount to a secular wandering of the pole around a slightly shifted axis. Actually the earth is flattened and nonrigid. *Subject Headings:* **1. Polar displacement 2. General circulation 3. Paleoclimatology.**—*Partly from author's abstract.*

3.9–208 551.583.7:593(94)

Teichert, Curt, **Fossile Riffe als Klimazeugen in Australien.** [Fossil reefs as climate indicators in Australia.] *Geologische Rundschau*, 40(1):33–38, **1952.** fig., refs. English summary p. 33. **DLC**—Coral reefs appear in E. Australia from Upper Silurian to Lower Carboniferous and again from Upper Tertiary to present. Significance difficult to assess. *Subject Headings:* **1. Climatic changes 2. Australia.**—*C.E.P.B.*

MICROCLIMATOLOGY

(See also items: 3.9–5, –124

3.9–209 551.584.2

Brooks, Charles E. P., **A proposed regional climatic survey.** *Meteorological Magazine*, London, 81(956):59–60, Feb. **1952.** ref. **DWB**—Comments on paper by K. Knoch (*see item* No. 2.10–165 in Oct. 1951 *Meteorological Abstracts*) and possibilities in Britain. *Subject Headings:* **1. Climatic surveys 2. Local climates. I. Knoch, K.**—*C.E.P.B.*

3.9–210 551.584.2:551.588.6

Burckhardt, Hans, **Lokale Klimaänderungen auf einem Berggipfel durch Kahlhieb.** [Local climatic changes on a mountain summit through deforestation.] *Angewandte Meteorologie*, 1(5):150–154, May **1952.** fig., 5 tables. **DWB**—An area of 20 ha on summit of Erbeskopf (Prussia), 816 m, was deforested in summer 1949. Observations 1940–44 and 1949–50, compared with Klein Feldberg (Taunus, 805 m) and Deuselbach (rainfall station), show

that clearing resulted in a marked increase of wind force, a decrease of relative humidity and especially rainfall, and greater fog frequency in summer. *Subject Headings:* **1. Forest influences 2. Deforestation.**—*C.E.P.B.*

3.9–211 551.584.2:631.4

Rassow, L., **Wachstumsgebiete in Sachsen-Anhalt.** [Growth regions in Saxony-Anhalt.] *Angewandte Meteorologie*, 1(5):142–146, May 1952. 4 figs., table, 3 refs. **DWB**—The formula of HAUDE and MOESE (1937) for evaluating agricultural climate from temperature and rainfall, is applied to construct a climate-soil chart and values are given for 34 places for 4 soil types. *Subject Headings:* **1. Agricultural climatology 2. Soil types 3. Saxony-Anhalt, Germany.**—*C.E.P.B.*

3.9–212 551.584.2:656.71(71)

Swansburg, R. H. and Barks, E. A., **Meteorological conditions at Dartmouth.** *Canada. Meteorological Division, Cir*-1981; *Local forecast study* No. 10, July 13, 1951. 3 p. diagrs., graphs. **DWB**—Describes topographic features of airport (near Halifax), and their effects on local variations of ceiling and visibility, which are not always visible from weather station. *Subject Headings:* **1. Airports 2. Halifax, Canada.**—*C.E.P.B.*

3.9–213 551.584.31

Smith, L. P., **Variations in air temperature and humidity on the weather slope of a coastal hill.** *Meteorological Magazine*, London, 81(958):102–104, April 1952. fig., table, ref. **DWB**—Monthly means of differences of temperature (extremes and 9 h), and of relative humidity and vapor pressure (9 h) between three stations at Aberystwyth, Wales, at 12, 452 and 950 ft above M.S.L. *Subject Headings:* **1. Microclimatology 2. Orographic effects 3. Aberystwyth, Wales.**—*C.E.P.B.*

BIOCLIMATOLOGY

(*See also items:* 3.9–4, –11, –78)

3.9–214 551.586:523.745:616.1

Fieber, S., **Untersuchungen über die Auslösung des Myokardinfarktes durch meteorologische und solare Faktoren.** [Investigations on the inception of myocarditis by meteorological and solar factors.] *Angewandte Meteorologie*, 1(5):129–136, May 1952. 10 figs., 12 refs. **DWB**—From Leipzig data 1935–44, 583 cases of sudden heat disease were compared with season, meteorological and solar conditions. A minimum June–Dec. is followed by a sudden increase in Jan. The *n*-method shows marked relations to change of air mass, especially to maritime air, and to passage of warm fronts and occlusions. There was a maximum of bright chromosphere eruptions 2–3 days before onset of disease, and some parallelism with sunspot relative numbers. *Subject Headings:* **1. Medical meteorology 2. Bioclimatology 3. *n*-method.**—*C.E.P.B.*

3.9–215 551.586:551.506.9:551.508.9

Flach, E., **Über ortsfeste und bewegliche Messungen mit dem Scholz'schen Kernzähler und dem Zeiss'schen Freiluftkonimeter.** [On measurements at fixed points and on journeys, with the Scholz nucleus counter and the Zeiss free air konimeter.] *Zeitschrift für Meteorologie*, 6(4):97–112, April 1952. 10 figs., 11 refs. **MH-BH**—The apparatus and technique of observations of nuclei and dust content of air, and their relation to weather type are discussed. Observations at fixed points of the edge of Bad Elster and Berlin are shown in the form of nuclei wind roses at Berlin; also particles of town and of country or sea origin (considered separately). Nuclei and dust distribution found on journeys by foot, car and electric train in and near Berlin, Dresden and Halle and through Erz Mountains are shown as charts and sections. The application of the results to bioclimatology and town planning is discussed. The tonic value of country air is found to depend in part on the scarcity of fine particles and a logarithmic scale of air purity is developed. *Subject Headings:* **1. Aerosol measurement 2. Aerosol counters 3. Nuclei count 4. Bioclimatology 5. Germany.**—*C.E.P.B.*

3.9–216 551.586:551.515:656.08 551.586:551.594.9:656.08

Reiter, Reinhold (*Munich*), **Verkehrsunfallziffer und Reaktionszeit unter dem Einfluss verschiedener meteorologischer, kosmischer und luftelektrischer Faktoren.** [Traffic accident statistics and reaction time under the influence of different meteorological, cosmic and atmospheric-electric factors.] *Meteorologische Rundschau*, 5(1–2):14–17, Jan–Feb. **1952.** 8 figs., 10 refs. **MH-BH**—Statistics of 21,000 traffic accidents and 45,000 reaction times of men, in Bavaria, were compared by *n*-method with weather conditions. Besides a weekly rhythm, results showed positive correlation of accidents with fog, heavy rain or snow, and of both accidents and reaction times with magnetic and electric (infra-long wave) disturbances. The last are regarded as an important bioclimatic indicator. No relations were found with sunshine, föhn or cosmic factors. *Subject Headings:* **1. Bioclimatology 2. Traffic accidents 3. *n*-method.**—*C.E.P.B.*

3.9–217 551.586:581

Goldman, Edward Alphonso, **Biological investigations in Mexico.** *Smithsonian Miscellaneous Collections*, v. 111, July 31, **1951.** 476 p. photos., map, biblio. **DSI**—Brief mention is made of conditions encountered in many trips made by author between 1892 and 1906. Brief discussion of climate of Mexico on p. 307–8, but the voluminous treatise contains great quantities of beautiful photographs showing topography and vegetation of every part of Mexico. *Subject Headings:* **1. Expeditions 2. Climate of Mexico 3. Mexico.**—*M.R.*

3.9–218 551.586:599.9

Jessen, Otto, **Nord und Süd in Gegensatz und Einklang: ein Vergleich.** [North and South in contrast and accord: a comparison.] *Petermanns Geographische Mitteilungen*, 96(1):6–15, **1952.** 18 refs. **DWB**—Differences of life and development between north and south are largely due to climate. Examples cited are NW–SE Europe (oceanic-Mediterranean climates), China (continental in north, monsoonal in south) and N. America (near approach of polar and tropical in the east). Especially important differences are in sunshine and light. Political and cultural forces mainly move north to south. *Subject Heading:* **1. Climatic control.**—*C.E.P.B.*

3.9–219 551.586:599.9

Schwidetzky, Ilse, **Selektionstheorie und Rassenbildung beim Menschen.** [The theory of selection and the development of races in man.] *Experientia*, Basel, 8(3):85–98, March 15, **1952.** 8 figs., refs. English summary p. 98. **DWB**—Superficial characters have little advantage for natural selection and are regarded merely as indicators of more fundamental differences which are related to climate. "Rules" relating stature and pigmentation to temperature are discussed; maps compare distribution of pigmentation with mean annual temperature (world) and areas of Quaternary glaciation (Europe), and world temperature with nasal index (a means of heat regulation). It is concluded that increased rates of mutation induced by environment as well as spontaneous mutation are important factors in race building. *Subject Headings:* **1. Bioclimatology 2. Human races.**—*C.E.P.B.*

3.9–220 551.586:631

Fedorov, E. E., **Mestnaia pogoda i ee rol' pri izuchenii klimaticheskikh usloviĭ na poverkhnosti zemli.** [Local weather and its role in study of climatic conditions on the earth's surface.] *Akademiia Nauk, SSSR, Institut Geografii, Trudy*, Vol. 48, Voprosy Klimatologii, **1950.** p. 63–70. 3 tables, 18 refs. **DLC**—Local weather is defined as the condition of the lower layer of the atmosphere which is influenced largely by radiational heat exchange between the surface and the atmosphere and by topographic factors. The relationships between weather types (in the sense of FEDOROV) and growth and development of wheat and cotton are discussed. *Subject Headings:* **1. Local climates 2. Plant ecology 3. Topographic effects.**—*I.L.D.*

3.9–221 551.586:92

Angus, T. C., **Sir Leonard Hill, F.R.S.** *Nature*, London, 169(4305):733–734, May 3, **1952.** **DWB**—SIR LEONARD HILL was born June 2, 1866 and died March 30, 1952. Trained

as a doctor, he worked on physiology including ventilation, effect of high temperatures and UV radiation, and designed the katathermometer. *Subject Headings:* **1. Obituaries 2. Biography 3. Hill, Sir Leonard.**—*C.E.P.B.*

SYNOPTIC CLIMATOLOGY

(*See also item:* 3.9–108)

3.9–222 551.589

Klimenko, L. B., **Izmenenie mestnoĭ pogody pri tranformatsii vozdushnykh mass letom i zimoĭ na ravnine Kazakhstana.** [The change of local weather during transformation of air masses in summer and winter on the plains of Kazakhstan.] *Akademiia Nauk, SSSR, Institut Geografii, Trudy*, v. 48, Voprosy Klimatologii, **1950.** p. 49–62. 3 figs., 7 tables, 6 refs. **DLC**—The summer and winter weather of the Kazakhstan plain is classified into the types established by FEDOROV-CHUBUKOV, and the successive transformation of weather types is analyzed by the complex-dynamic method of climatological analysis developed by these investigations. The predominating significance of local radiation balance and topographic factors in determining local weather types and in the transformation of air masses in Kazakhstan is indicated. *Subject Headings:* **1. Dynamic climatology 2. Weather types 3. Air mass movements 4. Topographic influences 5. Kazakhstan, U.S.S.R.**—*I.L.D.*

3.9–223 551.589.1:551.515.8(47)

Baĭbakova, E. M., **Dinamika mestnoĭ pogody pri kholodnykh vtorzheniiakh v dolinakh rek Rioni i Kury zimoĭ i letom.** [Dynamics of local weather during cold intrusions in the Rion and Kura valleys in winter and summer.] *Akademiia Nauk, SSSR, Institut Geografii, Trudy*, Vol. 48, Voprosy Klimatologii, **1950.** p. 3–31. 15 figs., 12 refs. **DLC**—An application of the complex-dynamic method of climatological analysis (FEDOROV-CHUBUKOV) to the study of the genesis of the climate of the Rion and Kura valleys in the Caucasus. The succession of local weather during both summer and winter under the influence of cold air masses is described. *Subject Headings:* **1. Dynamic climatology 2. Air masses 3. Weather types 4. Rion Valley, U.S.S.R. 5. Kura Valley, U.S.S.R.**—*I.L.D.*

3.9–224 551.589.1:551.509.33(4)

Baur, Franz, **Megmaradási hajlam, ismétlödési hajlam és teli idöjárás.** [Persistence, periodicity and winter weather.] Trans. from German. *Idöjárás*, 54(1–2):15–17, Jan.–Feb. **1950.** German original, *ibid.*, p. 61–62. 2 tables, 2 refs. **DWB**—Pointing out the phenomenon of persistence which consists of the preservation of certain characteristics of large air masses for an extended period and the effect of these air masses on adjacent areas, author examines the correlation between temperature over Berlin in the first part of December and winter temperature over central Europe in general and Budapest in particular. Data were taken from records representing a period of 100 years and are claimed to justify forecasts of winter temperature for central Europe with a very high degree of probability. *Subject Headings:* **1. Persistence 2. Periodicities 3. Winter temperatures 4. Temperature forecasting 5. Central Europe 6. Budapest, Hungary.**—*G.T.*

3.9–225 551.589.5:551.521.12

Veselý, Emil, **Bodování počasí podle Gregora a korelace s aktinometrem Arago-Davyho.** [Weather classification according to Gregor and correlation with the Arago-Davy actinometer.] *Meteorologické Zprávy*, 4(1–2):46–47, **1950.** fig., table, 8 refs. **MH-BH**—Several meteorologists, GREGOR among them, have worked out a method for presenting scales by which to classify the weather. Such indexes are the sums of smaller figures indicating various elements of the weather. GREGOR uses six figures, each of them ranging from 0 to 5 points, with a maximum total of 30 points. Comparisons of results obtained from these figures with those obtained through the Arago-Davy actinometer show identical results in 80% of the cases in summer and 54% in winter. Both the classification system and actinometric values can be used for limited practical purposes. Special classification systems could be worked out for farming, technical, sports and medical purposes. *Subject Headings:* **1. Radiation climate 2. Weather indexes 3. Actinometric data. I. Gregor, Alois.**—*G.T.*

MISCELLANEOUS APPLICATIONS

(*See also* Visibility, bibliography)

OPTICAL PHENOMENA

3.9–226 551.593.1

Barrell, H., **The dispersion of air between 2500A and 6500A.** *Optical Society of America, Journal*, 41(5):295–299, May **1951.** 3 tables, 9 refs., 9 equations. **DWB**—Tests of the dispersion equations for air have been made at the National Physical Laboratory at Teddington, Middlesex, England, and a new equation derived from experimental data previously obtained at three other laboratories on the refractive index of air in the visible region of the spectrum. The new equation is tested, and the refractivity density relationship formulated. *Subject Headings:* **1. Refractive index 2. Dispersion equations.**—*M.R.*

3.9–227 551.593.12

Little, C. G., **A diffraction theory of the scintillation of stars on optical and radio wavelengths.** *Royal Astronomical Society, Monthly Notices*, 3(3):289–302, **1951.** 3 figs., 2 tables, 20 refs., equations. **DWB**—Author makes 3 objections to refraction theory of scintillation and then sets out theory of Fresnel diffraction in a nonhomogeneous disturbing layer. This corresponds with that of BOOKER, RATCLIFFE and SHINN for radio waves (*see MAB* No. 3.8–72, Aug. 1952). The path change requires density gradients of 0.003% in 5 cm (i.e. a temperature gradient of 0.002°C/cm for refraction theory) in a disturbing layer 0.2 km thick. The effect varies with wave length and gives color changes. Theory is applied to local fluctuations of radio wave lengths from stars, caused by irregularities of about 5 km in F2 layer travelling at about 1000 km/hr. *Subject Heading:* **1. Scintillation.**—*C.E.P.B.*

3.9–228 551.593.54

Penndorf, R., **Nochmals "Blaue Sonne."** ["Blue sun" again.] *Umschau*, Frankfurt a.M., 52(10):320, May 15, **1952. DLC**—Brief note. Blue sun of Sept. 1950 due to scattering by particles of radius 0.5μ, 175 per cc. This gave maximum radiation at 4100A. *Subject Heading:* **1. Blue sun.**—*C.E.P.B*

3.9–229 551.593.55:551.594.51:535.33

Elvey, C. T. (*Naval Ordnance, China Lake, Calif.*), **Emission spectrum of the upper atmosphere at twilight.** (In: International conference on the emission spectra of the night sky and aurorae, London, 1947. **Papers, 1948.** p. 16–21. 4 figs., 6 refs.) **DWB**—A review and analysis of data obtained at McDonald Observatory in 1942 by ELVEY and FARNSWORTH. Conclusions are: 1) 6300Å auroral (red) line is enhanced by twilight for several hours before sunrise and after sunset, when the sun rays reach >1300 km above the surface; 2) residual intensity of this line decreases rapidly for 1.5 hours after sunset and then gradually through the night; 3) 5577Å (green) auroral line has no twilight enhancement and remains almost constant through the night; 4) 5892Å (yellow) line has sudden twilight enhancement, indicating Na^+ atoms from 60–120 km; 5) 6560Å line has similar enhancement to Na^+ line; 6) negative 3914Å line behaves similarly to red auroral line. Graphs show decrease in intensity with time and height. *Subject Headings:* **1. Twilight auroral spectra 2. Auroral spectra. I. Farnsworth, A. H. II. McDonald Observatory.**—*M.R.*

3.9–230 551.593.55

Iudalevich, F. F., **Osnovy teorii sumerechnykh iavlenii s uchetom vliianiia vtorichnogo rasseianiia sveta v atmosfere.** [Foundations of the theory of twilight phenomena with consideration of the influence of secondary scattering of light in the atmosphere.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 14(6):562–570, Nov.–Dec. **1950.** 8 figs., 13 equations. **DLC**—The author develops a geometrical method for calculating the degree of brightness of the secondary scattering of light in the twilight sky. By means of this method the brightness of the secondary scattering is calculated for zenith distances of the sun that ranged from 94° to 107° and a table giving the ratio of the brightness of the secondary scattering

to the brightness of the primary scattering is given. This method can be applied to calculate brightness up to 200–250 km. *Subject Headings:* **1. Twilight phenomena 2. Scattering of light 3. Twilight brightness.**—*I.L.D.*

3.9–231 551.593.7:551.521.31

Sekera, Zdenek (*University of Calif. at Los Angeles*), **Investigation of polarization of the sky light.** Contract AF 19(122):239, Progress Report, Nos. 1–3 Nov. 30, 1950–May 31, **1951.** graphs, refs. **DWB**—Technical information on the research work conducted by the University of California. Progress made in the development of instruments and in theoretical investigations is indicated and aims for future work, set. *Subject Headings:* **1. Sky light polarization 2. Solar radiation 3. Polarization measurement equipment. I. California. University at Los Angeles, Dept. of Meteorology II. Contract AF 19(122)-239.**—*G.T.*

3.9–232 551.593.7

Valníček, Boris, **Polarisace atmosférického světla.** [Polarization of atmospheric light.] *Meteorologické Zprávy*, 4(5/6):108–110, **1950.** 7 figs., 5 refs. **MH-BH**—General survey of the history, methods, present state and future prospects of atmospheric polarization measurement with references to scientists engaged in such work. The problem is outlined and attention is given to particular situations such as eruption of volcanoes, the effect of clouds, etc. Explanatory graphs are presented. *Subject Headings:* **1. Polarimeters 2. Polarization 3. Atmospheric optics.**—*G.T.*

ELECTRICAL PHENOMENA

(*See also items:* 3.9–8, –89, –188, –216, –229)

3.9–233 551.594.6:551.515.8

Berson, F. A. and Petterssen, Sverre, **Atmospherics in relation to fronts and air masses, winter 1942–43.** Pencilled in: *U. S. Office of Naval Operations, NAVAER* 50:IT-38, June **1943.** 12 p. charts. **DWB**—Observations of sferics made between Dec. 1, 1942 and March 10, 1943, are analyzed statistically. The three stations are Dunstable, Leuchars and St. Eval in the British Isles, with base lines of 425, 370 and 220 miles. The accuracy of observations, geographical distribution and relation of sferics to cyclone waves, occlusions, cold fronts *mP*, *cP* and *mT* air masses, the frequency and periodicity of frontal atmospherics are considered. Data are shown on charts of North Atlantic or on polar charts on a grid of 2° squares. *Subject Headings:* **1. Sferics 2. Frontal thunderstorms 3. North Atlantic. I. Great Britain. Meteorological Research Committee.**—*M.R.*

3.9–234 551.594.6

Newman, M. M., **Lightning atmospherics transients investigation of the Lightning and Transients Research Institute, Minneapolis, Minnesota.** (In: **Thunderstorm electricity.** Chicago University, Dept. of Meteorology, Oct. **1950.** p. 249–275. 12 figs.) **DWB**—Author describes the high voltage generator for producing artificial lightning, an experimental airplane set-up for studying radio interference and the working of wave shapes by measuring apparatus in oscillographic studies. *Subject Headings:* **1. Lightning 2. Sferics.**—*I.L.D.*

3.9–235 551.594.7

Beckmann, B., **Die ionosphärische und troposphärische Steuerung der Funkwellenausbreiten.** [Ionospheric and tropospheric steering of wireless broadcasts.] *Zeitschrift für Meteorologie*, 6(4):112–117, April **1952.** 4 figs., 10 refs., 8 equations. **MH-BH**—The transmitting frequency (UFB) of the space wave from a broadcasting station lies between the limits of reflection and damping in the ionosphere. Its distribution, diurnal and annual variations are illustrated and discussed. Refraction in the troposphere (normally at about 8000 m) plays an important part in extending the range only of ultra-short and decimeter waves in inversions. It is much less regular than ionospheric steering. The index of refraction, which depends on moisture content, is small and only becomes effective with wave inclination under 1°. *Subject Heading:* **1. Radio wave propagation.**—*C.E.P.B.*

3.9–236 551.594.7

Christall, F. I. and Cubitt, J. D., **Unusual radar performance, Red Sea.** *Marine Observer*, 22(155):14–15, Jan. 1952. **DWB**—March 1, 1951. Pronounced echoes at 50,000–60,000 yards separated by a gap from normal echoes at 30,000 yards. Example of superrefraction. *Subject Headings:* **1. Superrefraction 2. Radar echoes.**

3.9–237 551.594.7:621.396

Northover, F. H., **The anomalous propagation of radio waves in the 1–10 metre band.** *Journal of Atmospheric and Terrestrial Physics*, 2(2):106–129, **1952.** fig., 12 refs., 109 equations. **DWB**—Anomalous propagation of meter waves is discussed mathematically and results applied to an observed dry bulb inversion from 41–51°F at 3900 ft above Cardington (England). Wet bulb 40°F. It is found that such an upper inversion, sharp enough to act as a discontinuity, can cause considerable anomalous propagation in waves of 3½ and 7 m. *Subject Headings:* **1. Radio transmission ducts 2. Anomalous radio propagation.**—*C.E.P.B.*

3.9–238 551.594.7:621.396.8

Perers, Olaf F., Stjernberg, Bo. K. E., and Forsgren, K. H., **Microwave propagation in the optical range.** *Gothenburg, Sweden. Chalmers Tekniska Högskola, Handelingar*, No. 108, **1951.** 19 p. graphs, photos, refs. Price: Kroner 3–. **DWB**—In 1946 when these propagation tests began in the vicinity of Gothenburg, Sweden, access to reports on similar works by foreign scientists was not possible. The results presented are still valuable for studying the influence of local weather conditions on propagation of microwaves, and consist of: transmission field strength, attenuation, refraction, fading and diurnal variation of 10, 3 and 1 cm wave lengths. Equipment, sites of installations and records are shown in photographs. *Subject Headings:* **1. Microwave propagation 2. Microwave research 3. Gothenburg, Sweden. I. Gothenburg, Sweden. Chalmers Tekniska Högskola. Research Laboratory of Electronics.** —*W. N.*

3.9–239 551.594.7:621.396.1

Schneider-Carius, Karl (*Bad Kissingen, Germany*), **Meteorologische Faktoren bei der Ausbreitung ultrakurzer Funkwellen.** [Meteorological factors in the propagation of ultrashort radio waves.] *Geofisica Pura e Applicata*, 20:131–137, July–Dec. **1951.** 4 figs., table, 9 refs. German and English summaries p. 131. **MH-BH**—The actual similarity between visible light and extreme high frequency radio wave propagation in the troposphere is brought out by means of formulas and diagrams, and the meteorological aspects, treated on the basis of vertical soundings of temperature, humidity and refractive index. Superrefraction through surface ducts and through ducts in the upper layers ("bodennahe Umkehrschichten" and "höhere Umkehrschichten") can be explained by the refraction in inversions such as occur at the surface or the trade wind inversion (peplopause); with a high peplopause no refraction will occur. Quantitative values are given for limiting conditions. *Subject Headings:* **1. Radio transmission ducts 2. Ultrashort wave propagation 3. Inversions 4. Peplopause.**—*M.R.*

ACOUSTICAL PHENOMENA

3.9–240 551.596.1:551.524.7:551.557.2

Crary, A. P., **Stratosphere winds and temperatures in low latitudes from acoustical propagation studies.** *Journal of Meteorology*, 9(2):93–109, April **1952.** 22 figs., 8 tables, 11 refs. **MH-BH**—Tests of sound-ranging method (*see item* No. 8–146 in Aug. 1950 *Meteorological Abstracts*) near Hawaii, Canal Zone, Bermuda and Florida are described and velocity-height curves up to 40–60 km (100–120 km near Florida) presented. Most probable temperatures and winds are deduced. The results confirm earlier studies, showing light winds over continental areas in low latitudes in winter and low temperatures and high winds over oceanic areas. The sources of error in this experimental method are discussed. *Subject Headings:* **1. Acoustical soundings 2. Upper air temperatures 3. Stratospheric winds.**—*C.E.P.B.*

PART II. SELECTIVE ANNOTATED BIBLIOGRAPHY ON VISIBILITY

By: *Nikolay T. Zikeev*

EXPLANATORY NOTE

Progress of air navigation after the First World War has led to systematic observation of a new meteorological element—visibility. The development of air mass analysis also promoted an increasing interest in the visibility problem. Thus, most of the works in this bibliography were published in the last 25–30 years. Early investigations were chiefly related to the study of air turbidity or to a description of cases of unusual visibility, especially of mountain ranges. The official instructions to observers issued in the 19th and in the first quarter of the 20th century recommended only recording of instances of exceptional visibility.

A progress in measurement techniques (visibility meters) has also been noteworthy in the last 30 years. The prototypes of visibility meters were proposed by de Saussure in 1787–1788 (construction of so called cyanometer and diaphanometer). Some considerations on the problem were offered by Schlagintweit (1848) and Beer (1854), but good instruments and methods were introduced only in the first 20 or 30 years of our century (Wigand's visibility meters, Koschmieder's method, Middleton's investigations, etc.).

The investigation of visibility range is a very complicated problem because visibility conditions depend on many different physical and physiological factors. The attention afforded the problem has resulted in many hundreds of investigations on visibility and problems related to it. In the following selected bibliography, the problems of physical and physiological factors, visibility data, slant, vertical and color visibility, visibility in fog and methods of visibility observation have been emphasized. Text books and many works of a general type were not included, as a rule.

Interesting items relating to visibility can be found also in a "Cumulative annotated bibliography on atmospheric pollution by smoke and gases" by Harris P. Kramer and Malcolm Rigby (*MAB v.* 1, No. 1, Jan. 1950, Numbers: A-4; A-36; A-37; A-78; A-130; A-141; A-152; A-159; A-173 and A-240). For an exhaustive list of references on all aspects of visibility see the bibliography of over 2000 items (*see* 3I-269) by Weiner and Leikind, published by the Library of Congress, Tech. Info. Div., July 1952.

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BIBLIOGRAPHY ON VISIBILITY

1788

3I–1 551.591:551.501 551.508.92

de Saussure, Horace Bénédict, **Description d'un diaphanomètre ou d'un appareil destiné à mesurer la transparence de l'air.** [Description of a diaphanometer, an apparatus to measure the transparency of the air.] (*R.*) *Accademia delle Scienze di Torino, Memorie*, 4:409–424, **1788–1789. DLC, NNC**—The investigations of meteorological conditions carried out by the author in the Alps stimulated his interest in problems of air transparency and visibility. Observations of white objects on black background and vice versa indicated that the difference of brightness between object and background has a certain relationship to air transparency. On the basis of these observations the author constructed the so called diaphanometer for quantitative measurement of vision range and air transparency. The measuring procedure proposed by DE SAUSSURE is: the diaphanometer (black disc on white screen) is fixed vertically and the observer measures the distance at which the disc becomes invisible when disc and background fuse. The author also describes results of observations made in the Swiss Alps by means of the diaphanometer and remarks on the influence of moisture on air transparency. *Subject Headings:* **1. Visibility measurement 2. Visibility meters 3. Saussure's diaphanometer.**

3I–2 551.508.93

de Saussure, Horace Bénédict, **Description d'un cyanomèter ou d'un appreil à mesurer l'intensité de la couleur bleue du ciel.** [Description of a cyanometer, an apparatus for measuring the intensity of the blue color of the sky.] *Accademia delle Scienze di Torino, Memorie*, 4:425–453, **1788–1789.** Also in: *Journal de Physique, de Chemie, d'Histoire naturelle et des Arts*, Paris, 38:199–208, March **1791.** fig., 2 tables, refs. **DLC**—Development of author's work on the problem of air transparency measurement, which was stimulated during ten years of Alpine travel (1774–1784). He constructed an instrument called a cyanometer to test the relative transparency of the air and to determine the blueness of the sky. This instrument has a disc with a scale of 40 different degrees of blue, ranging from a very light blue to a dark blue. The blueness of the sky is compared with the scale on the instrument. Experimental observations were first carried out in 1877 in the Alps and at Geneva. They showed that atmospheric transparency and the observed large variations of color intensity depend on the content of water vapor in the air. *Subject Headings:* **1. Transparency meters 2. Sky color 3. Saussure's cyanometer.**

1796

3I–3 551.508.92

Murhard, Wilhelm August, **Ueber des Herrn Saussüre Diaphanometer.** [On Saussure's diaphanometer.] *Annalen der Physik, Gren Ser.*, Leipzig, 4(1):101–106, **1796.** ref. **DLC**—A complete review of SAUSSURE's work published in 1788 (*see* 3I–1 amd 3I–2 above) on two instruments, cyanometer and diaphanometer, constructed by him. The first was to be used for qualitative observations of air transparency, while the second was intended for quantitative measurements in a limited area. Description of the apparatus and measuring procedures with the diaphanometer are given. *Subject Headings:* **1. Visibility meters 2. Saussure's diaphanometer.**

1880

3I–4 551.591.361

Abercromby, Ralph, **Ueber die Durchsichtigkeit oder die ungewöhnliche Klarheit der Luft, der zufolge ferne Objekte sehr nahe erscheinen.** [On the transparency or unusual clearness of air which causes distant objects to seem very near.] *Meteorologische Zeitschrift*, 15:29–30, **1880. DWB**—The author concludes, on the basis of his own observations, that unusual visibility of objects located at a great distance can be observed more often in dry air than in humid air without fog and haze. Hot and very cold weather as well as very dry air are favorable factors for unusual visibility. *Subject Heading:* **1. Exceptional visibility.**

1895

3I–5 551.591(4)

***†**Meidinger, H., **Die Durchsichtigkeit der Luft in Hinblick auf Fernsichten.** [The transparency of the air from the point of view of unusual visibility.] *Naturwissenschaftlicher Verein, Karlsruhe, Abhandlungen*, v. 11, **1895.** Abstracted from reprint. 52 p. fig. **DWB**—The factors important to atmospheric transparency and its variations are discussed. The most important are haze and industrial smoke, precipitation and wind. The author establishes the degree of influence exerted by each factor on the basis of observations on the visibility of the Alps. *Subject Headings:* **1. Exceptional visibility 2. Atmospheric transparency 3. Visibility of mountains.**

1896

3I–6 551.591.361

*Schultheiss, —, **Ueber die Durchsichtigkeit höherer Luftschichten nach den Beobachtungen der Alpenaussicht am Südlichen Schwarzwald.** [On the transparency of the upper layers of the atmosphere according to observations on the visibility of the Alps in the southern Black Forest.] *Meteorologische Zeitschrift*, 13(12):445–454, Dec. **1896.** tables, refs. **DLC**—Report of observations on the visibility of the Alps, which were made from the meteorological station at Höchenschwand (1000 m) during 1883–1894. Seasonal variations in the visibility of the Alps and relation between visibility and weather are discussed. *Subject Headings:* **1. Exceptional visibility 2. Visibility variations 3. Visibility data 4. Höchenschwand, Germany.**

1901

3I–7 551.591:551.576

Trabert, Wilhelm, **Die Extinktion des Lichtes in einem trüben Medium (Sehweite in Wolken).** [Extinction of light in a turbid medium (vision range in clouds).] *Meteorologische Zeitschrift*, 18(11):518–524, Nov. **1901.** table, refs., equations. **DLC**—Theoretical study of the dependence of visibility in clouds on water content and size of water drops. *Subject Headings:* **1. Visibility in clouds 2. Turbidity.**

1905

3I–8 551.591.31/32:551.515.8(436)

*Samec, Maximilian, **Durchsichtigkeit der Luft bei verschiedenen Witterungszuständen in Wien.** [Transparency of the air under different weather conditions in Vienna.] (*K.*) *Akademie der Wissenschaften, Vienna, Math.-Naturw. Klasse, Sitzungsberichte, Abt. I*, 114(9):1519–1568, Nov. **1905.** 16 figs., 17 tables, refs. **DLC**—Special observations were carried out in Vienna during a period of over a year (Dec. 1903–1904). The conditions of visibility and transparency of air were investigated in different synoptic situations, air masses, and velocity and direction of wind. Frequency of fog, mist and clear weather for each season are presented. The relation between visibility (especially unusual visibility) and humidity, cloudiness and precipitation is shown in tables and analyzed. A special table of frequency of visibility of snow covered mountains is given. *Subject Headings:* **1. Visibility data 2. Weather conditions 3. Air mass analysis 4. Visibility observations 5. Vienna, Austria.**

1914

3I–9 551.591.1

Stuchtey, Karl, **Über die verschiedene Helligkeit der einzelnen Teile des Dunsthorizonts.** [On various degrees of brightness of different parts of a misty horizon.] *Meteorologische Zeitschrift*, 31(7):351–354, July **1914.** 4 figs., ref. **DLC**—A report on a series of experimental observations with pilot balloon soundings. Brightness of horizon as an important factor to range of vision was determined for air with different percentages of humidity. The dependence of brightness of horizon on azimuth of the sun was investigated. *Subject Headings:* **1. Visibility 2. Brightness of horizon.**

1916

3I–10 551.591 551.591.361(494)

*Maurer, J., **Merkwürdige Schwankungen der Sichtbarkeit der Alpen.** [Remarkable oscillations of visibility of the Alps.] *Meteorologische Zeitschrift*, 33(4):168–170, April **1916.** 3 tables, refs. **DLC**—Summary of observations which were made from Zurich during a 50-year period (1865–1915). The author discusses the variations of range of vision as dependent on weather conditions and especially on the föhn. *Subject Headings:* **1. Exceptional visibility 2. Visibility data 3. Föhn effects 4. Long period records 5. Zurich, Switzerland.**

1918

3I–11 551.591

Great Britain. Meteorological Office, **The weather of the British coasts.** March 4, **1918.** 158 p. maps, figs., tables. *M.O.* No. 230. **DLC**—On p. 40, entitled "Visibility," the rule for calculating the range of visibility is given. It is noted that visibility in British sea regions accompanies, to a certain extent, the meteorological situations described in Chap. 11. (The observer's experience refers to the general features of the weather map, p. 114–129 with figs. and maps.) *Subject Headings:* **1. Visibility 2. British Coasts.**

1919

3I–12 551.508.92 551.591:551.501

Wigand, Albert, **Eine Methode zur Messung der Sicht.** [A method of visibility measurement.] *Physikalische Zeitschrift*, Leipzig, 20(7):151–160, April 1, **1919.** 2 figs., 3 tables, refs., equations. **DLC**—A short review of the development of visibility measurement. The first meter was constructed by DE SAUSSURE (1789), the next by SCHLAGINTWEIT (1848) and by BEER] (1854). The author analyzes the technique of visibility measurement, remarks on the theory of range of vision and describes in detail the newly constructed visibility meter which is known at present as Wigand's wedge visibility meter. The results of experimental observations are presented and discussed. *Subject Headings:* **1. Visibility meters 2. Wigand's wedge visibility meter 3. Visibility measurement techniques.**

1920

3I–13 551.591:551.501 551.508.92

Jones, Loyd A., **A method and instrument for the measurement of the visibility of objects.** *Philosophical Magazine*, London, 6th Ser., 39(229):96–134, Jan. **1920.** 13 figs., table, 17 equations. **DLC**—One of the earliest comprehensive investigations of the visibility problem and its instrumental measurement. Theoretical analysis of visibility conditions, physiological factors affecting visibility, etc. are emphasized. The natural causes of lowered visibility are also investigated. The author presents a detailed description of his visibility meter and the results obtained with it. The visibility meter is constructed on the photometric principle. *Subject Headings:* **1. Visibility theory 2. Visibility meters.**

3I–14 551.591(431/5)

Tetens, Otto, **Die Sichtbeobachtungen des Aeronautischen Observatoriums Lindenberg.** [Visibility observations at the Lindenberg Aeronautical Observatory.] *Meteorologische Zeitschrift*, 37(12):348–349, Dec. **1920.** 2 tables. **DLC**—A report on a preliminary investigation of visibility made at the observatory in the preceding year without visibility meters. *Subject Headings:* **1. Visibility observation 2. Lindenberg, Germany.**

1921

3I–15 551.591:551.509.3

Galbas, P. A., **Über die Verwendbarkeit von Dunstbeobachtungen für die Prognose.** [On the application of turbidity observations for forecasting.] *Meteorologische Zeitschrift*, 38(9):277–278, Sept. **1921. DLC**—An analysis of the relation between visibility and air masses. The observations made during 12 years at Taunus Observatory (821 m) showed that visibility variations depend on the weather and could be used for weather forecasting. *Subject Headings:* **1. Visibility 2. Weather conditions 3. Weather forecasting.**

3I–16 551.591.361(4)

*Gockel, Albert, **Durchsichtigkeit der Atmosphäre und Wetterprognose.** [Atmospheric transparency and weather forecasting.] *Meteorologische Zeitschrift*, 38(3):78–82, March **1921.** tables, refs. **DLC**—A description of unusual visibility of the Alps and relation between visibility conditions and forthcoming weather. The number of days with good visibility (1907–1919) and frequency of precipitation after a period of good visibility are given in tables and discussed. *Subject Headings:* **1. Exceptional visibility 2. Visibility data 3. Weather forecasting 4. Visibility of mountains.**

3I–17 551.591

Schmauss, August, **Randbemerkungen 7. Verbesserung der Fernsicht.** [Marginal notes 7. Improvement of visibility range.] *Meteorologische Zeitschrift*, 38(8):225, Aug. **1921. DLC**—The author recommends the use of red or yellow glass filters and an instrument which would polarize diffuse light thus increasing the visibility range. *Subject Heading:* **1. Exceptional visibility.**

3I–18 551.508.92

Wigand, Albert, **Ein neuer Sichtmesser.** [The new visibility meter.] *Physikalische Zeitschrift*, Leipzig, 22(17):484–487, Sept. 1, **1921.** 3 figs., refs. **DLC**—An analysis of theoretical principles of the author's wedge visibility meter. This meter can determine quantitatively the visual range by day and night. *Subject Headings:* **1. Visibility meters 2. Wigand's wedge visibility meter.**

1922

3I–19 551.591

von Myrbach, Otto, **Wetterlage und Durchsichtkeit der Atmosphäre.** [Weather conditions and atmospheric transparency.] *Meteorologische Zeitschrift*, 39(2):61–62, Feb. **1922.** ref. **DLC**—

Discussion of relation between forthcoming weather and visibility conditions. *Subject Headings:* **1. Visibility 2. Atmospheric transparency 3. Weather forecasting.**

1923

3I–20 551.508.9

Pollak, Leo Wenzel, **E. Goldbergs Sichtmesser.** [E. Goldberg's visibility meter.] *Meteorologische Zeitschrift*, 40(8):244–246, Aug. **1923.** ref. **DWB**—Description of a comparative wedge photometer constructed by GOLDBERG for visibility measurements. Author's short description was given in "Enzyklopedia der Photographie," No. 99, 1922. Review in *Naturwissenschaften*, 10:861, 1922. *Subject Heading:* **1. Visibility meters.**

1924

3I–21 551.508.9

Dannmeyer, F., **Über relative Sichtmessung durch Stufen und Keilfilter.** [On the relative measurement of visibility by step and wedge filters.] *Annalen der Hydrographie und Maritimer Meteorologie*, 52(5):108–113, April 30, **1924.** 7 figs., refs. **DLC**—Report on observations made at the mouth of the Elbe since 1909. Visual observations with Wigand's visibility meter showed greater visibility range at night for colored lights than for white. Some results of observations are given and discussed. *Subject Headings:* **1. Visibility measurement techniques 2. Visibility meters 3. Color visibility.**

3I–22 551.591(42

*Dines, L. H. G. and Mulholland, P. I., **On the inter-relation of wind direction with cloud amount and visibility at Cahirciveen, Co. Kerry.** *Great Britain. Meteorological Office, Professional Notes* 3(36):152–171, **1924.** 9 tables, refs. **DWB**—In the first part, the relation between wind direction and cloud amount is analyzed. In the second part, the relation between wind direction and visibility is analyzed on the basis of observations from Feb. 1919 to Dec. 1920. Given special consideration are: 1) variations of visibility with wind direction and speed; 2) unusual visibility as a sign of coming rain; 3) variation of haze with wind; 4) origin of impurities in the atmosphere and 5) the relation between visibility and dryness of the air. *Subject Headings:* **1. Visibility data 2. Visibility variations 3. Wind direction 4. Cahirciveen, Ireland.**

3I–23 551.591:551.593.5

Weiler, Margarete, **Über Sicht- und Sehweiten in schwach getrübten Medien. Experimentelle Beitrag zur Lösung des Problems von der Form des blauen Himmels.** [Visibility in a moderately turbid medium. Experimental contribution to the problem of the form of the blue sky.] *Annalen der Physik*, 4th Ser., 74(12):347–361, **1924.** 2 figs., 8 tables, refs. **DLC**—The author reviews previous investigations on the problem of the determination of the flattening of the canopy of the sky. The variations of values depending on the degree of brightness were analyzed by DEMBER and UIBE who presented their own theory of the causes of these variations. For a more complete study of the problem and verification of the Rayleigh law for a turbid medium, the author carried out special observations of visibility in an air medium saturated with a weak emulsion of mastic. *Subject Headings:* **1. Visibility 2. Shape of sky.**

1925

3I–24 551.591(43

Hellmann, Gustav, **Über die Wetterlage bei guter Fernsicht von Bergeshöhen.** [On the weather situation during good visibility from mountains.] (*K.*) *Akademie der Wissenschaften, Berlin, Phys.-Math. Klasse, Sitzungsberichte*, 30:533–538, Nov. **1925.** 2 tables. **DLC**—Analysis of the effect of weather conditions on unusual visibility, based on observations made at mountain stations on Schneekoppe (1602 m), Arnsdorf (437 m), Brocken (1142 m) and other places during 1901–1910 and 1921. The author pays special attention to air temperature distribution with height and discusses dependence of unusual visibility on the synoptic situation (unusual visibility is more probable in an anticyclone]. *Subject Headings:* **1. Visibility from mountains 2. Germany.**

3I–25 551.510.42(75

Kimball, H. H. and Hand, I. F., **Investigation of the dust content of the atmosphere.** *Monthly Weather Review*, 53(6):243–246, June **1925.** 4 figs., 6 tables. **DWB**—Summary of determination of dust content of the atmosphere made at American University, Washington, D. C., with an Owen dust counter. Variations are shown with direction and velocity of wind and with seasons, and are attributed to local smoke. Close relation shown between the limit of horizontal visibility and the dustiness of the atmosphere. (Same as *MAB*, A–33, Jan. 1950.) *Subject Headings:* **1. Visibility 2. Weather conditions 3. Washington, D. C.**—*H.P.K.*

1926

3I–26 551.591

Götz, Friedrich Wilhelm Paul, **Eine gelegentliche Untersuchungsmethode der Sicht.** [A convenient method of visibility investigation.] *Naturforschende Gesellschaft Graubündens, Chur, Switzerland, Jahresbrichte, Neue Folge,* 64:277–284, **1925/1926.** 2 figs., 3 tables, 6 refs., 7 equations. Abstracted from reprint. **DWB**—The brightness measurement of snow and shadow squares can be used for visibility measurement. The author made photographs of snow-covered and snow-free squares and determined the differences of brightness by means of a microphotometer. *Subject Heading:* **1. Visibility observation techniques.**

1928

3I–27 551.508.92

*Bylov, M. V., **O nabliudeniiakh s klinovym izmeritelem vidimosti.** [On observations with the wedge visibility meter.] *Zapiski po Gidrografii,* 54:201–210, **1928.** fig., 4 tables, equations. **DLC**—Experimental investigations with Wigand's wedge visibility meter and its accuracy in determining the range of vision under different weather conditions. *Subject Heading:* **1. Wigand's wedge visibility meter.**

3I–28 551.591(495)

*Livathinós, A. N., **Causes des troubles atmosphériques et la visibilité à Athènes.** [Causes of atmospheric disturbances and visibility at Athens.] *Greece. Ethnikon Askeroskopeion Athnon, Annales,* Pt. I, 10:57–74, **1928.** 2 figs., 7 tables, refs. **DLC**—A summary of visibility observations at Athens during Dec. 1922–Nov. 1927. Annual variations and seasonal characteristics are analyzed. The author discusses the influence of different factors (thunder, fog, cloudiness, wind direction and velocity, etc.) on visibility. *Subject Headings:* **1. Visibility data 2. Athens, Greece.**

1929

3I–29 551.591:551.55

Keil, Karl, **Windrichtung und Sicht.** [Wind direction and visibility.] *Beiträge zur Physik der freien Atmosphäre,* 15:87–89, **1929.** tables, ref. **DLC**—A study made on the basis of observations at several points in Germany showed that visibility depended on wind direction in coastal regions, but inland the relation with wind direction was not noticed. *Subject Headings:* **1. Visibility variations 2. Wind direction.**

3I–30 551.591

Löhle, Friedrich, **Lichtzerstreuung und Sicht.** [Diffusion of light and visibility.] *Meteorologische Zeitschrift,* 64(2):49–59, Feb. **1929.** 7 figs., 3 tables, 25 refs., 10 equations. **MH-BH**—Theoretical study of the estimation of visibility and brightness of optical haze in layers near the ground. *Subject Headings:* **1. Visibility near the ground 2. Optical haze.**

3I–31 551.591

Löhle, Friedrich, **Über Sichtschätzung und optische Trübung der bodennahen Luftschichten.** [Visibility measurement and optical haze in the air layers near the ground.] *Annalen der Hydrographie und Maritimen Meteorologie,* 57(10):327–341, Oct. **1929.** 9 figs., 4 tables, refs., equations. **DLC**—Causes of visibility measurement errors are discussed and photometric methods of measuring visibility through haze during the day and at night are mathematically analyzed. *Subject Heading:* **1. Visibility.**

3I–32 551.591.31(43)

*Mey, —, **Stündliche Sichtschätzungen vom Flugplatz Bremerhaven.** [Hourly estimation of visibility over Bremerhaven airfield.] *Annalen der Hydrographie und Maritimen Meteorologie,* 57(7):234–236, July 15, **1929.** 4 tables. **DLC**—A report on visibility observations made during July 1927–March 1928. *Subject Headings:* **1. Visibility data 2. Bremerhaven, Germany.**

3I–33 551.591:612

Runge, I., **Die Unterschiedsschwelle des Auges bei kleinem Sehwinkel.** [Contrast threshold with a small angle of vision.] *Physikalische Zeitschrift,* Leipzig, 30(3):76–77, Feb. **1929.** 2 figs., 2 tables, 3 refs. **DLC**—Report on experimental work carried out in the laboratory of the Osram Society in Berlin. Relation between vision range, brightness and vision angle were investigated. *Subject Headings:* **1. Visibility 2. Contrast threshold 3. Physiological factors in visibility.**

1930

3I–34 551.591.11

Bennett, M. G., **The physical conditions controlling visibility through the atmosphere.** *Royal Meteorological Society, Quarterly Journal*, 56(233):1–29, Jan. **1930.** 11 figs., 30 refs., 14 equations. **DLC**—Physical-theoretical study, analyzing in detail the basis for visibility determination. *Subject Heading:* **1. Physics of visibility.**

3I–35 551.591.31:551.591.6(431.2)

*Koschmieder, Harald Hans and Rühle, H., **Dantziger Sichtmessungen.** [Visibility measurements in Danzig.] *Danzig. Staatliches Observatorium, Forschungsarbeiten*, No. 2 and 3, **1930.** 38 and 47 p. figs., tables, refs., equations. Review in: *Monthly Weather Review*, 58(12):439–444, Dec. **1930. DWB**—Report on experimental investigations made during 1927–1929, using different instruments. Special black and white screens were also used for visibility observation. The authors present remarks and some corrections to the visibility theory and discuss the sources of error caused by physical and physiological factors and weather conditions. *Subject Headings:* **1. Visibility data 2. Visibility measurement techniques 3. Danzig.**

1931

3I–36 551.591.6

Baldit, Albert, **Procédés de mesure de la visibilité verticale et oblique.** [Technique of measuring vertical and slant visibility.] *La Météorologie*, Paris, 7:362–367, **1931.** fig. **DWB**—Describes methods of measuring visibility with and without instruments. *Subject Headings:* **1. Visibility measurement techniques 2. Slant visibility 3. Vertical visibility.**

3I–37 551.591:551.575

Baldit, Albert, **La visibilité et le brouillard au point de vue de la sécurité aéronautique.** [Visibility and fog from the point of view of safety in air navigation.] *La Météorologie*, 7:354–361, **1931.** **DWB**—The author describes technique of visibility measurement (horizontal, slant, vertical and night visibility) and studies problems of fog formation, fog forecasting and fog dissipation. *Subject Headings:* **1. Visibility measurement 2. Fog.**

3I–38 551.508.92 551.593.3

*Bender, Kurt, **Untersuchungen am Wigandschen Sichtmesser.** [Investigations with Wigand's visibility meter.] *Zeitschrift für angewandte Meteorologie*, 48(2–5):33–43, 66–72, 97–105, 129–136, **1931.** 9 figs., 26 tables, refs. **DWB**—An intensive experimental study made in Giessen, Karlsruhe and Lindenberg. Diurnal and annual variations of visibility range were analyzed in connection with other meteorological factors (especially cloudiness, wind, and humidity). Numerous laboratory investigations of Wigand's step and wedge visibility meters in relation to color, brightness of observed objects and their background were carried out. *Subject Headings:* **1. Visibility data 2. Wigand's visibility meter.**

3I–39 551.508.92

Bennett, M. G., **A visibility meter.** *Journal of Scientific Instruments*, London, 8(4):122–126, April **1931.** fig., table, 3 refs. **DLC**—A meter is described which measures the degree of clearness with which any particular object can be seen. Very slightly ground glass which is just sufficient to obscure the object observed is the measure of its visibility. Various precautions are adopted, which obviate the sources of error found in other instruments of this type. Applications to meteorology and illuminating engineering are described. *Subject Heading:* **1. Visibility meters.**—*Author's abstract.*

3I–40 551.591:551.575

Houghton, H. G., **The transmission of visible light through fog.** *Physical Review*, Minneapolis, 2nd Ser., 38(1):152–158, July 1, **1931.** 5 figs., 5 refs. **DWB**—Report on experimental measurements which were made through artificial fog. The results of observations for different densities of fog (from 0.10 to 0.20) in relation to wave-length (0.400–0.700μ) and transmission ratio are presented in diagrams. *Subject Headings:* **1. Visibility in fog 2. Color visibility 3. Transmission of light.**

3I–41 551.591.1

Judd, Deane B., **Extension of the standard visibility function to intervals of 1 millimicron by third-difference osculatory interpolation.** *U. S. Bureau of Standards, Journal of Research*, 6(3):465–471, March **1931.** fig., 5 tables, refs. **DLC**—By the method of osculatory interpolation the visibility function is represented as a series of parabolas of the third degree which join at the specified values so as to have a common first derivative at the junction point. *Subject Heading:* **1. Visibility.**—*From author's abstract.*

3I–42 551.591:551.575

Külb, W., **Die Schwächung sichtbarer und ultraroter Strahlung durch künstliche Nebel und ihre Wirkung auf die Sicht.** [Weakening of visible and infra-red radiation by artificial fog and its effect on visibility.] *Annalen der Physik*, 5th Ser., 11(6):679–726, **1931.** 10 figs., refs., equations. **DLC**—A short review of previous work and description of investigations carried out under artificial fog conditions. Analysis of visibility conditions in fog and comparison of theory with experimental data. The influence of fog on visibility by direct and diffuse lighting is considered. *Subject Headings:* **1. Visibility in fog 2. Fog 3. Infrared radiation.**

3I–43 551.591:551.501:629.13

Kurz, Gerhard, **Messung der Sicht vom Führersitz verschiedener Flugzeugmuster.** [Measurement of visibility from the pilot's cockpit of different airplane types.] *Zeitschrift für Flugtechnik und Motorluftschiffahrt*, 22:167–176, March 28, **1931.** English trans. in: *U. S. NACA, Technical Memorandum*, No. 646, Nov. **1931. DLC**—An experimental work. Special visibility meters were constructed for observation. Visibility measurements made from six different types of airplanes and from automobiles were compared. Minimum visibility requirements and some numerical coefficients are given. *Subject Headings:* **1. Visibility measurement techniques 2. Visibility from airplanes.**

3I–44 551.591:551.508.92

Mézin, Maurice, **Perfectionnement des mesures de la visibilité horizontale.** [Improvement of horizontal visibility measurements.] *La Météorologie*, Paris, 7:368–372, **1931.** fig., ref. **DWB**—The author discusses the problem of visibility measurement at present, comments on instrumental techniques and describes the nephelometer constructed by Gamba. *Subject Headings:* **1. Visibility measurement techniques 2. Visibility meters 3. Nephelometers.**

3I–45 551.591

Mézin, Maurice, **Procédés de mesure de la visibilité pendant la nuit.** [Technique of visibility measurement at night.] *La Météorologie*, Paris, 7:373–375, **1931. DWB**—Some remarks on improvement of methods of night visibility observation (more accurate measurement of power and distance of light sources; application of light-filters, etc.). *Subject Headings:* **1. Night visibility 2. Visibility measurement techniques.**

3I–46 551.591

Middleton, W. E. Knowles, **The measurement of visibility at night.** *Royal Society of Canada, Transactions*, 3rd Ser., v. 25, Sec. 3:39–48, 1931. 3 figs., 2 tables, equations, 8 refs. **DLC**—Theory and analysis of visibility measurement at night. *Subject Headings:* **1. Night visibility 2. Visibility measurement techniques.**

3I–47 551.521.3:551.591

Stratton, J. A. and Houghton, H. G., **A theoretical investigation of the transmission of light through fog.** *Physical Review*, New York, 38(1):159–165, **1931.** 4 figs., 11 refs., equations. **DWB**—This theoretical investigation was undertaken in an attempt to explain some unexpected experimental results which are described in detail in another paper. The fog droplets are assumed to be dielectric spheres with an index of refraction of 1.33 and the development is based on the work of Mie and Debye on the pressure of light and the colors of colloidal solutions. The results show that the particle size of the fog is a controlling factor in the transmission characteristics of the fog. By assuming the appropriate particle size, a theoretical transmission curve is obtained which closely corresponds to the experimental data. In conclusion, it is pointed out that the King formula is not applicable to the scattering of light by particles as large as fog drops. (Same as *MAB* 3F 26, June 1952.) *Subject Headings:* **1. Transmission of light 2. Visibility in fog 3. Physics of visibility.** —*Author's abstract.*

1932

3I–48 551.591.1

Bennett, M. G., **The visual range of lights at night, and its relation to the visual range of ordinary objects by day.** *Royal Meteorological Society, Quarterly Journal*, 58(245):259–267, July **1932.** 3 figs., table, 6 refs., 6 equations. Discussion p. 267–270. **DLC**—Theoretical considerations and experimental observations, carried out by the author, made it possible to determine the effect of the intensity of light on visual range, the effect of background brightness and relation between the visual range or ordinary objects by day and of lights at night. *Subject Headings:* **1. Night visibility 2. Daytime visibility.**

3I–49 551.591.31/32:551.591.361(431/5)

*Eicker, Edmund, **Versuch einer Auswertung von Sichtschätzungen.** [Essay on visibility evaluations.] *Zeitschrift für angewandte Meteorologie*, 49:1–7; 33–39; 65–73, **1932.** figs., tables, 7 refs. **DWB**—A comprehensive study of visibility for three airports in Germany: Frankfurt a.M., Fürth and Stuttgart. The author presents characteristics of diurnal, seasonal and annual visibility variations, and discusses dependence of visibility variations on other meteorological factors (air masses, humidity, wind). Unusually good visibility of mountain ranges was observed many times at Stuttgart during föhn. *Subject Headings:* **1. Visibility data 2. Exceptional visibility 3. Föhn effects 4. Frankfurt a.M., Germany 5. Stuttgart, Germany.**

3I–50 551.591.1

Foitzik, Leonhard (*Lindenberg*), **Sichtweite bei Tag und Tragweite bei Nacht.** [Visibility by day and by night.] *Meteorologische Zeitschrift*, 49(4):134–139, April **1932.** 2 figs., 12 refs., 10 equations. **MH-BH**—Theoretical study of physical conditions of visibility in relation to color, brightness of objects, background (sky, forest, snow field, etc.) and air absorption. Equations are presented for visibility of lights at night. *Subject Headings:* **1. Physics of visibility 2. Night visibility.**

3I–51 551.591.1:551.510.42

Nukiyama, Daizo and Kobayasi, Atsusi, **On the transmissibility of the visible light through a cloud of particles.** *Tokyo. University. Aeronautical Research Institute, Reports*, Pt. 1, 7(1):1–18, **1932**: Pt. 2, 7(11):307–338, **1933**; Pt. 3, 8(2):61–100, **1933.** figs., tables, refs., equations. **DWB**—An experimental study of clouds obtained from incense and substances used in military smoke screens. The radii of the particles were measured and the positions of the maximum transmissibility for each cloud were determined. Rayleigh's scattering formula discussed. *Subject Headings:* **1. Physics of visibility 2. Smoke screens.**

3I–52 551.591:551.589.5

*Piaskovskaia, E. V., **Atmosfernaia vidimost' kak faktor pogody.** [Atmospheric visibility as a weather factor.] *Zhurnal Geofiziki*, 2(3–4):329–336, **1932.** 3 tables, 5 equations. German summary p. 336. **DLC**—Observations of visibility were made at Kuchino (18 km from Moscow) during June–August 1931 with Zeiss' wedge photometer. Two pairs of screens, painted black and white, were used for the measurement. Results of observations were analyzed and compared with synoptic conditions. A strong relation was found between the value of the absorption coefficient and type of air masses (Arctic, Polar, Tropical, etc.). *Subject Headings:* **1. Visibility data 2. Air mass analysis 3. Moscow Area, U.S.S.R.**

3I–53 551.591.2(261)

Pick, W. H., **Visibility at sea.** *Royal Meteorological Society, Quarterly Journal*, 58(245):251–255, July **1932.** 4 tables, 3 refs. Discussion p. 255–256. **DLC**—A study based on publications in the Daily Weather Reports (International Section) for the years 1924–1928. These observations were made in the North Atlantic in the area lying between long. 10°W and 40°W and between lat. 40°N and 60°N. The author analyzes relation between visibility and air and sea temperatures, and visibility and wind force. Consideration is also given to fog and its formation under certain temperature and wind conditions. It was found that the eastern North Atlantic is a region of singularly good visibility in summer and in winter. Good visibility occurs when air temperature is lower than sea temperature. *Subject Headings:* **1. Visibility at sea 2. North Atlantic Ocean.**

3I–54 551.591.1(42)

*Pick, W. H., **Visibility with saturated air.** *Royal Meteorological Society, Quarterly Journal*, 58(244):165–168, April **1932.** 5 tables, 6 refs. **DLC**—Report of special observations obtained at two stations in England—Worthy Down, an inland rural site and Felixstowe, a coastal one. The author discusses the results of observations made during 1927–1930, determines distribution of visibility in saturated air, and fog and mist distribution. Two tables give the relation between wind speed and visibility. *Subject Headings:* **1. Visibility in humid air 2. England.**

3I–55 551.501:551.591 551.508.92

Pollak, L. W. and Gerlich, W., **Lichtelektrische Sichtmessungen.** [Photoelectric visibility measurements.] *Beiträge zur Geophysik*, 35(1):55–65, **1932.** 5 figs., 18 refs. **DWB, DLC**—The principles of popular visibility meters are analyzed and discussed. The authors give a description of a new photoelectric method of measuring brightness with a glow-cathode-valve and a new Tungsram photo-cell. The application of this method to the determination of visibility by means of E. Goldberg's and Wigand's visibility meters is considered. *Subject Headings:* **1. Visibility meters 2. Visibility measurement techniques 3. Wigand's visibility meter.**

3I–56 551.591

Wilcox, Warren Wesley, **The basis of the dependence of visual acuity on illumination.** *National Academy of Sciences, Wash. D. C., Proceedings*, 18(1):47–56, Jan. **1932.** 4 figs., 3 refs. **DLC**—A study of the dependence of visual acuity of the human eye on variations of light intensity and other physiological factors. The author reviews works done previously by Hecht, Houstoun and Volkman. The working hypothesis determining the variations of the resolution threshold with intensity of the test objects by bright or dark bars on dark or black background and the effect of irradiation was confirmed by experiments. *Subject Headings:* **1. Physiological factors in visibility 2. Brightness contrast.**

1933

3I–57 551.591:551.576

Albrecht, Fritz, **Theoretische Untersuchungen über den Strahlungsumsatz in Wolken.** [Theoretical investigations on radiation exchange in clouds.] *Meteorologische Zeitschrift*, 50(12):478–486, Dec. **1933.** 4 figs., 2 tables, 5 refs., 12 equations. **MH-BH**—A comprehensive investigation of visibility in clouds for various lengths of light waves. The author analyzes relation between density of clouds, diameter of drops and vision range, and also considers turbulence as important factor in visibility variations. *Subject Headings:* **1. Visibility in clouds 2. Radiative exchange 3. Spectral transparency of atmosphere 4. Turbulence effects.**

3I–58 551.508.92

Foitzik, Leonhard (*Lindenberg*), **Ein neuer Sichtmesser.** [A new visibility meter.] *Meteorologische Zeitschrift*, 50(12):473–474, Dec. **1933,** fig., equations. **MH-BH**—Description of a visibility meter constructed by Zeiss and based on a principle advanced by Koschmieder. Turbidity and visibility are determined by photometric measurements of the brightness of objects located at a distance from 100 m to 1000 m. *Subject Heading:* **1. Visibility meters.**

3I–59 551.591.1

Hampton, W. M., **The visibility of objects in a searchlight beam.** *Physical Society of London, Proceedings*, 45:663–671, June 2, **1933.** 5 figs., 8 tables, refs., 10 equations. Discussion p. 671–672. **DWB**—Calculation of visibility of objects of different sizes illuminated by a projector and with different reflecting powers. *Subject Headings:* **1. Night visibility 2. Physics of visibility.**

3I–60 551.591.3(479)

*IAroslavtsev, I. N., **Nabliudeniia nad vidimost'iu klinovym izmeritelem Viganda.** [Visibility observations with Wigand's wedge meter.] *Zhurnal Geofiziki*, 3(2):212–221, **1933.** figs., 12 tables, 4 refs. German summary p. 221. **DLC**—Report on visibility observations made during May–Oct. 1929 at Krasnodar. The author notes the defects of Wigand's visibility meter and presents results of observations. Monthly mean visibility data, diurnal variations and frequency of visual range (for 5 km intervals) are given. *Subject Headings:* **1. Visibility observations 2. Wigand's visibility meter 3. Krasnodar, U.S.S.R.**

3I–61 551.591.36

*Italy. Ufficio Presagi, **Riassunto mensile delle osservationi di visibilità orrizontale, della velocità e della direzione del vento al suolo e a quote seconda la forma stabilita dalla Commissione Internazionalle di Navigazione Aerea.** [Monthly results of observations of horizontal visibility and direction and speed of surface winds in the second form approved by the International Commission of Air Navigation.] No. 1–12, **1928–1933.** tables. **DWB**—The issues contain monthly frequency data of visibility for numerous points in Italy obtained from observations made at 0700, 1300 and 1800 G.M.T. *Subject Headings:* **1. Visibility data 2. Italy.**

3I–62 551.521.3 551.515.8(479)

*†Mamontova, Lidiia and Khromov, Sergeĭ, **Trübungsfaktoren für verschiedene Typen troposphärischer Luftmassen über Moskau.** [Turbidity factor for various types of tropospheric air masses over Moscow.] *Meteorologische Zeitschrift*, 50(1):11–18, Jan. **1933.** 2 figs., 2 tables, 20 refs. **MH-BH**—A study based on observations made in the meteorological observatory (Petrovsko-Rasumovskoe) near Moscow during 1931. The lowest value of the turbidity factor, 2.06, was observed in masses of maritime arctic air; it was 2.45 in continental arctic air; 2.66 in maritime polar air, 3.09 in continental polar air and 3.49 in tropical continental air. The authors also present daily variations of turbidity factor in various air masses. *Subject Headings:* **1. Turbidity factor 2. Air mass transparency 3. Moscow, U.S.S.R.**

3I–63 551.591:551.575

Stoecker, E., **Beiträge zur Frage der Sichtbarkeit von Lichtsignalen bei Tage.** [Contribution to problem of visibility of signal lights by day.] *Beiträge zur Geophysik*, 40(1):75–95, **1933.** 17

figs., 4 tables, refs. German, English and French summaries on p. 75–76. **DLC, DWB**—An experimental investigation of the visual range during fog. Observations were made of red light spots on a luminous white background. Use of red light filters increases the visibility range in fog. *Subject Headings:* **1. Visibility in fog 2. Infrared filters.**

3I–64 551.591.1:551.575:629.13

Stone, Robert G., **The laws of diffusion of light in fog and their application to air navigation and fog recording. (A review with comments.)** *American Meteorological Society, Bulletin*, 14(6–7):168–171, June July **1933.** refs. **DLC**—A comprehensive review of different physical factors that determine visibility conditions in fog. *Subject Headings:* **1. Visibility in fog 2. Aerial navigation**

3I–65 551.591:551.501:551.575

Zikeev, Nikolay T., **O primenenii metodov fotograficheskoĭ fotometrii dlia opredeleniia vidimosti** [Application of methods of photographic photometry for visibility determination.] Special report. Review in: *Leningrad. Glavnaia Geofizicheskaia Observatoriia. Postoiannaia Aktinometricheskaia Komissiia, Biuleten'*, No. 3(26), **1933. DLC**—Report before the meeting of the Permanent Actinometric Commission of the Central Geophysical Observatory on special experimental investigations made by the author at Voronezh University during 1932–1933. The half black and half white screens, located under analogous conditions of illumination but at different distances from observer, were photographed simultaneously with a neutral glass wedge. Colored glass filters (yellow, green and red) were also used for experiments. The most effective results were obtained in cases of dissipating radiation fog. *Subject Headings:* **1. Visibility measurement techniques 2. Fog observation 3. Photometry.**

1934

3I–66 551.591:551.501 551.508.92

Fesenkov, V. G., **Opyt issledovniia opticheskikh svoĭstv vozdukha fotometricheskim putem** [An attempt at a photometric investigation of the optical properties of the air.] *Zhurnal Geofiziki*, 4(2):143–164, **1934.** 2 fig., tables, ref., equations. English summary p. 163–164. **DLC**—A special surface photometer was constructed to measure the scattering capacity of the optical properties of the air. The author develops the theory and methods of observation and presents a general formula for calculating atmospheric visibility. *Subject Headings:* **1. Visibility measurement techniques 2. Visibility meters 3. Photometry.**

3I–67 551.591.32/6(79

*Frost, Ruben L., **Cold winter in Alaska.** *American Meteorological Society, Bulletin*, 15(5):137–141, May **1934. DLC**—Characteristics of the meteorological conditions at Fairbanks, Alaska during an unusually cold winter, 1933–1934. Gives values of visibility range at the earth's surface and slant visibility from pilot balloon observations. *Subject Headings:* **1. Visibility in cold weather 2. Slant visibility 3. Fairbanks, Alaska.**

3I–68 551.521.

Götz, Paul, **Die Wellenlängenabhängigkeit der Dunstextinktion.** [The dependence of mist extinction on the wave length.] *Meteorologische Zeitschrift*, 51(12):472–474, Dec. **1934.** figs., 9 refs., equations. **MH-BH**—A theoretical study based on some measurements made by the author. *Subject Headings:* **1. Atmospheric transparency 2. Color visibility.**

3I–69 551.521.

Haurwitz, Bernhard and Wexler, Harry, **Trübungsfaktoren nordamerikanischer Luftmassen** [Turbidity factor of North American air masses.] *Meteorologische Zeitschrift*, 51(6):236–238, June **1934.** 6 refs. **MH-BH**—Analysis of observations made during 1931–1932 in Washington, D. C., and in 1933 at Blue Hill Observatory (near Boston, Mass.). *Subject Headings:* **1. Turbidity factor 2. Air mass transparency 3. Washington, D. C. 4. Blue Hill Observatory, Mass.**

3I–70 551.59

Middleton, W. E. Knowles, **Sichtweite bei Mondlicht, Sternlicht und Dämmerung.** [Visibility during moonlight, starlight and twilight.] *Meteorologische Zeitschrift*, 51(11):425–427, Nov. **1934.** 2 figs., 3 refs., 2 equations. **MH-BH**—The oscillations of the contrast threshold of the human eye were experimentally investigated during twilight and night brightness. The variations of sensibility were determined for different ranges of visibility (day ranges of visibility varied from 5 km up to 20 km). *Subject Headings:* **1. Twilight visibility 2. Night visibility 3. Contrast threshold.**

3I–71 551.59

†Mrose, Helmut, **Abhängigkeit der Sicht von Landschaft und Wetterlage.** [Dependence of visibility on landscape and weather.] *Zeitschrift für angewandte Meteorologie*, 51(8):267–27

Aug. 1934. refs. **DWB**—Author gives numerous examples of this dependence based on his own observations and also on investigations published previously. *Subject Headings:* **1. Visibility 2. Weather conditions.**

3I–72 551.591 551.589.5

Namias, Jerome, **An introduction to the study of air mass analysis. II. Conservative properties of air masses.** *American Meteorological Society, Bulletin*, 15(10):226–230, Oct. **1934.** refs. **DLC**—On p. 229 under the title "Visibility" the author describes briefly visibility conditions in different air masses. *Subject Headings:* **1. Visibility 2. Air mass transparency.**

3I–73 551.591.361/6(797)

Rigby, Malcolm, **Unusual visibility in the Northwest.** *American Meteorological Society, Bulletin*, 15(5):121–122, May **1934.** **DLC**—Report on cases of unusual visibility observed in 1933 and 1934 from the earth's surface and by pilot balloons. (Distance from observer to balloon was about 24 miles.) *Subject Headings:* **1. Exceptional visibility 2. Slant visibility 3. Spokane, Wash.**

3I–74 551.591:551.521.3

Steinhäusser, Hans, **Horizontalsicht bei örtlich veränderlicher Trübung und Beleuchtung.** [Horizontal visibility during locally variable turbidity and brightness.] *Zeitschrift für Geophysik*, 10(1):59–65, **1934.** 2 figs., 5 tables, 4 refs., 16 equations. **DWB**—Theoretical investigation of the relation between local turbidity of the air and visibility range for long distances. *Subject Headings:* **1. Turbidity 2. Exceptional visibility.**

3I–75 551.591:629.13(768)

Williamson, Robert M., **Visibility, a new element in meteorological observation.** *Tennessee Academy of Science, Journal*, 9(2):93–99, April **1934.** tables. **DWB**—Some remarks on visibility as an element of great importance to aviation. Review of instructions issued for visibility observation and report on the results of observations made by the author during several winters beginning in 1927–1928 at Nashville. *Subject Headings:* **1. Visibility observation techniques 2. Aeronautical meteorology 3. Nashville, Tenn.**

1935

3I–76 551.591.1

Bennett, M. G., **Further conclusions concerning visibility by day and night.** *Royal Meteorological Society, Quarterly Journal*, 61(259):179–186, April **1935.** 3 figs., table, 4 refs., 9 equations. Discussion p. 186–188. **DLC**—Some experiments were carried out at Kew and Farnborough for the verification of the theories of visibility presented by KOSCHMIEDER and the author. Analysis of these observations showed that Koschmieder's formula is not quite correct quantitatively. The threshold ϵ in Koschmieder's equation is also not constant. It is impossible to disregard scattering of light from the object (which was considered in author's theory). *Subject Headings:* **1. Physics of visibility 2. Contrast threshold 3. Koschmieder's theory.**

3I–77 551.591

Buckham, Alfred G., **Visibility and smoke in relation to aerial photography.** (In: National Smoke Abatement Society, **Conference on Smoke and Aviation, Westminster, May 30, 1935.** London, Chandos House, [**1935**]. p. 29–35. Discussion p. 36–39.) **DWB**—*Subject Heading:* **1. Visibility.**

3I–78 551.591(43) 551.521.31:551.575

Foitzik, Leonhard (*Lindenberg*), **Über die spektrale Lichtdurchlässigkeit von Naturnebeln.** [Spectral transmission of light through natural fog.] *Meteorologische Zeitschrift*, 52(12):458–460, Dec. **1935.** 5 figs., 6 refs. **MH-BH**—Report on special visibility observations made with the Zeiss night visibility meter at various points in Germany to determine visibility conditions in fog and mist. More intensive absorption was observed for the blue part of the spectrum with visibilities of more than 900 m. Visibility lower than 900 m gave no significant difference for transparency in the short and long portions of the spectrum in fog. With visibility lower than 300–400 m caused by mist, but not by fog, the following peculiarities were observed: transparency was 10–15% lower for blue light than that for green light and 10–15% higher for red light. (Same as *MAB* 3F–37, June 1952.) *Subject Headings:* **1. Visibility 2. Fog 3. Light penetration 4. Germany.**

3I–79 551.591.1

Gershun, A. A. and Lazarev, D. N., **K voprosu o vliianii osvescheniia na vidimost'.** [On the problem of the influence of brightness on visibility.] *Svetotekhnika*, No. 4:1–2, April **1935.** **DBS**—An investigation to determine the dependence of visibility on brightness of the object and the background. *Subject Headings:* **1. Physics of visibility 2. Brightness contrast.**

3I–80 551.591.6

Jacobson, R. C., **A vertical visibility scale.** *American Meteorological Society, Bulletin*, 16(10): 239–241, Oct. **1935.** table, ref. **DLC**—Gives six degree (0–5) scale of visibility which depends on the appearance of a ground object when viewed vertically downwards. *Subject Headings:* **1. Vertical visibility 2. Visibility scales.**

3I–81 551.508.92

Kähler, K., **Die atmosphärische Sicht und ihre Messung.** [Atmospheric visibility and its measurement.] *Naturwissenschaften*, 23(16):253–256, April 19, **1935.** table, 5 refs. **DLC**—A theoretical study with critical review of the methods for calculation and apparatus used to measure the visual range. *Subject Headings:* **1. Visibility 2. Visibility meters.**

3I–82 551.591

Kariakin, N. A. and Kuznetsov, V. V., **K voprosu o raschete i otsenke svetovykh vrashchaiushchikhsia maiakov.** [On the problem of calculation and estimation of optical properties of rotating lighthouse beams.] *Svetotekhnika*, No. 10:2–8, Oct. **1935.** 15 figs., 7 refs., 6 equations. **DLC**—Analysis of technical conditions and light properties of different types of lighthouse beacons and study of the physiological factors in visibility (contrast threshold of the human eye depending on brightness and duration of light). The relation between white sources of light and visibility is shown in a table for different grades of air transparency. *Subject Headings:* **1. Night visibility 2. Visual range 3. Illumination intensity 4. Beacons 5. Contrast threshold.**

3I–83 551.591.6(43)

Löhle, Friedrich, **Über die Schrägsicht.** [On slant visibility.] *Meteorologische Zeitschrift*, 70(11):435–438, Nov. **1935.** 4 figs., 9 refs., 5 equations. **MH-BH**—Mathematical analysis of the results of visibility observations from Rosskopf (766 m) to the Rhine Valley (250 m). *Subject Headings:* **1. Slant visibility 2. Germany.**

3I–84 551.591.1 551.508.92

†Luckiesh, Matthew and Moss, Frank K., **Visibility: its measurement and significance in seeing.** *Franklin Institute, Philadelphia, Journal*, 220(4):431–466, Oct. **1935.** 6 figs., 4 tables, 20 refs. **DLC**—Fundamental consideration of the physical and physiological bases of visibility. Several visibility meters are described. *Subject Headings:* **1. Physics of visibility 2. Physiological factors in visibility 3. Visibility meters.**

3I–85 551.508.92

Middleton, W. E. Knowles, **Experiments with a telephotometer. The dependence of extinction coefficient upon wave-length.** *Beiträge zur Geophysik*, 44(4):358–375, **1935.** 6 figs., 5 tables, 12 refs. **DLC, DWB**—An instrument was constructed which measures directly the brightness ratio between two objects nearly in the line of collimation. The experimental observations show an increasing dependence of the extinction coefficient upon wave length as the air becomes clearer. *Subject Headings:* **1. Visibility meters 2. Spectral transparency of atmosphere 3. Extinction coefficient.**—*From author's summary.*

3I–86 551.591

Middleton, W. E. Knowles, **The principles underlying the choice of visibility marks.** *Monthly Weather Review*, 63(1):17–19, Jan. **1935.** 3 tables, 11 refs., 4 equations. **DLC**—Analysis of the physical factors important for visibility determination (brightness, color, background of the object) and the selection of visibility marks themselves. *Subject Headings:* **1. Physics of visibility 2. Visibility observation techniques 3. Visibility targets.**

3I–87 551.591.1

Middleton, W. E. Knowles, **On the colours of distant objects and the visual range of coloured objects.** *Royal Society of Canada, Transactions*, 3rd Ser., Section 3, 29:127–154, May **1935.** 6 figs., 5 tables, 15 refs., 34 equations. **DLC**—The author presents a theory of color visibility and its application to visual range when viewing colored objects. *Subject Heading:* **1. Color visibility.**

3I–88 551.591(02):551.501 551.591.6

†Middleton, W. E. Knowles, **Visibility in meteorology. The theory and practice of the measurement of the visual range.** Toronto, **1935.** 104 p. table, refs. Review in: *Royal Meteorological Society, Quarterly Journal*, 61:156, **1936**; *Meteorologische Zeitschrift*, 70(11):445, **1935**; *American Meteorological Society, Bulletin*, 16:276, **1935.** 2nd ed. completely rev. and enl. Toronto, University of Toronto Press, **1941.** 165 p. 32 figs., tables, 342 refs. **DWB, DLC**—A remarkably complete and systematic treatment of the physical, optical and instrumental aspects of visibility and the

measurement of visual range, including a discussion of the behavior of light in pure and polluted atmospheres, the extinction coefficient, contrast threshold brightness, influence of angular dimensions, threshold for point sources and diffuse illumination, day and night visibility of black, white, gray and colored objects in fog, and of light sources; vertical and slant visibility, dependence on time of day, season, humidity, wind, air mass, haze, and, finally, forecasting of fog. The appendix contains an unusually thorough chapter on the visual range of colored objects, with theory and nomograms for calculation of visibility in different spectral ranges, and a 17-page bibliography. *Subject Headings:* **1. Visibility measurement 2. Horizontal visibility 3. Slant visibility 4. Textbooks.**—*M.R.*

3I–89 551.591:551.575

Mili, Gjon, **Visibility of signals through fog.** *Optical Society of America, Journal*, 25(8):237–240, Aug., **1935.** 5 figs., 8 refs. **DLC**—The practical limit of visibility of lights at sea is approximately 0.35–0.31 candle at a range of one mile. (Experiments carried out by the Deutsche Seewarte and Paterson and Dudding.) Some experiments on visibility range during fog were made and the relation between the candle power signal and the visibility range determined. *Subject Headings:* **1. Visibility in fog 2. Night visibility.**

3I–90 551.510.42:656.7

National Smoke Abatement Society, **Conference on Smoke and Aviation, Westminster, May 30, 1935.** London, Chandos House, [1935]. 39 p. **DWB**—Contains a significant group of papers on atmospheric pollution and aviation with occasional application to visibility. Authors: C. S. Durst; William Courtenay; Alan Goodfellow; Alfred G. Buckham. (Same as *MAB* A–49, Jan. 1950.) *Subject Headings:* **1. Atmospheric pollution 2. Visibility 3. Aviation 4. Weather conditions.**—*H.P.K.*

3I–91 551.591:551.501(09)

†Sebastian, H., **Sicht und Sichtbestimmung.** [Visibility and visibility measurement.] *Beiträge zur Geophysik*, 45(1–2):35–62, **1935.** 75 refs., equations. **DLC**—Excellent review of the visibility problem up to date. Author considers physical and physiological factors influencing visibility measurements and gives the history of the development of measurement methods. *Subject Headings:* **1. Visibility measurement 2. History of meteorology.**

3I–92 551.591

Vishnevskiĭ, N. A. and Tsyrlin, B. A., **Vidimost' postoiannogo i probleskovogo ogneĭ na razlichnykh fonakh v usloviiakh slaboĭ osveshchennosti.** [Visibility of steady and intermittent lights on different backgrounds during weak illumination.] *Svetotekhnika*, 12:2–5, Dec. **1935.** 3 figs., 7 tables, equations. **DLC**—Report on an experimental investigation of visibility conditions of steady and flashing lights. Observations made of white and colored illumination on white or colored background. *Subject Headings:* **1. Visibility of lights 2. Color visibility.**

3I–93 551.591(42)

*Wright, H. L., **Visibility and atmospheric suspendoids at Kew Observatory.** *Royal Meteorological Society, Quarterly Journal*, 61(258):71–77, Jan. **1935.** 4 tables, 2 refs. Discussion p. 71–80. **DLC**—Special investigations on the visibility and the concentration of particles and nuclei carried out at the Observatory during 1928–1930. The actual objects used for these observations were located at a distance up to 20,000 m. The number of particles was determined by means of the Owens jet dust counter and the number of nuclei by the Aitken nuclei counter. The measurements of absolute and relative humidity were included in these investigations. It was found that visibility range above 2 km is practically independent of nuclei and humidity. The range of visibility varies inversely as the number of particles rise to a quantity apparently a little greater than unity. Mist and fog are associated with high humidity and with high concentration of particles and nuclei. *Subject Headings:* **1. Visibility observations 2. Visibility 3. Atmospheric composition 4. Nuclei count 5. Kew Observatory, England.**

1936

3I–94 551.591:551.575

Clusy, Henry, **Brumes et brouillards.** [Haze and fog.] *Technique Aéronautique*, Paris, 27(139):64–73, **1936.** 2 figs. **DWB**—Some remarks on the confusion of the terms haze and fog and characteristics of conditions under which these phenomena occur. The author describes visibility conditions in haze and fog and takes up the problem of haze and fog dissipation. *Subject Headings:* **1. Visibility in fog 2. Visibility in haze.**

3I–95 551.591.1(54)

*Karve, C. S., **Dependence of the "visibility" of an object on its apparent size.** *Current Science*, Bangalore, 4(12):855–857, June **1936.** 2 figs. **DLC**—Report on experiments carried out

at Fergusson College, Poona. Five different sizes of square, white sheets of paper were used for observations. The range of vision was determined by Wigand's step visibility meter. Observations of the objects were made at different distances (from 50 to 180 m) under sky light and sun light illumination against a black background. *Subject Headings:* **1. Visibility observations 2. Visibility markers 3. Wigand's step visibility meter 4. India.**

3I–96 551.591.1

Löhle, Friedrich, **Sichtschätzung und Luftlichtmessung.** [Scale of visibility and measurement of illumination.] *Zeitschrift für angewandte Meteorologie*, 53(3):71–82, March **1936.** 5 figs., refs. 14 equations. **DWB**—Discussion of physics of visibility. The relation between visibility range and air brightness and turbidity is analyzed. The author compares values of visibility obtained from actual observations with those calculated theoretically. *Subject Heading:* **1. Physics of visibility.**

3I–97 551.591.1

Middleton, W. E. Knowles, **The apparent colour of lights at night with an observation of blue fog.** *Royal Meteorological Society, Quarterly Journal*, 62(267):473–480, Oct. **1936.** fig., table, 8 refs., 6 equations. **DLC**—Application of trichromatic equations to cases of fog and haze. *Subject Headings:* **1. Visibility in fog 2. Visibility in haze 3. Color visibility.**

3I–98 551.591.3:551.508.92

*Nakorenko, N. F., **Rezul'taty nabliudenii nad vidimost'iu v Institute aerologii v 1932 33** [Results of visibility observations at the Institute of Aerology during 1932–1933.] *Leningrad Glavnaia Geofizicheskaia Observatoriia, Trudy, Aerologiia*, 7(1):82–87, **1936.** 4 figs., 7 tables, refs. equations. **DLC**—Observations were made with Wigand's visibility meter. Daily and annual variations of visibility range are summarized and discussed. The author compares results with analogous observations made at Fürth and Stuttgart in Germany. Prof. P. A. Molchanov concludes that the investigation was made for verification of the method of observation and showed that the method using Wigand's meter is not correct because the range of visibility has wide variations depending on brightness of the observed objects. *Subject Headings:* **1. Visibility observations 2. Visibility variations 3. Wigand's visibility meter 4. Slutsk, U.S.S.R. I. Molchanov, P. A.**

3I–99 551.591:551.57

Roff, Merril Flagg, **Perception and visibility through fog.** *Journal of General Psychology*, 15(2):269–291, Oct. **1936.** fig., table, 17 refs. English, French and German summaries p. 288–290. **DLC**—Description of an installation for the production of artificial fog. Critical review of works containing theory of light transmission through fog. The visibility of red, green and blue sources of light was recorded and the result of experiments is discussed. *Subject Headings:* **1. Visibility in fog 2. Color visibility 3. Transmission of light.**

3I–100 551.59

Vorontsov, B., **Opredelenie dal'nosti videniia noch'iu priborom Viganda.** [Determination of visibility range at night with a Wigand visibility meter.] *Meteorologiia i Gidrologiia*, 1(8):72–75, Aug. **1936.** table, 13 equations. **DLC**—Analysis of the physical conditions of visibility of beacon lights and derivation of equations for determining night visibility. *Subject Headings:* **1. Night visibility 2. Beacons.**

1937

3I–101 551.591 551.508.9

Kedrolivanskiĭ, V. N., **Vidimost'.** [Visibility.] (In: **Meteorologicheskie pribory.** [Meteorological instruments.] Moscow, Glavnoe Upravlenie Gidrometeorologicheskoĭ Sluzhby, **1937** p. 234–237, 2 figs., table.)—Instruction for observers for day and night visibility observation and description of Wigand's visibility meters. *Subject Headings:* **1. Visibility observing instruction 2. Wigand's visibility meters.**

3I–102 551.591.2:551.588.2(43

*Mahrt, W., **Über die Zusammenhänge von Windrichtung, relativer Feuchtigkeit und Sicht mit besonderer Burücksichtigung der lokalen Einflüsse.** [On the relation between wind direction, relative humidity and visibility with special consideration of local influences.] *Germany. Reichsamt für Wetterdienst, Erfahrungsberichte*, New Ser., Pt. 3:127–139, **1937.** 7 tables, 3 refs., equations. **DLC**—Study based on numerous observations made in Kassel (1927–1931), Frankfurt a.M. and Munich (1926–1931), and Berlin (1925–1931) during day and at night. The author analyzes results of these observations in great detail and concludes that the local orography is very important in the distribution of visibility and relative humidity. *Subject Headings:* **1. Visibility distribution 2. Visibility data 3. Orographic effects 4. Germany.**

3I–103 551.591:551.501:551.575

†Mézin, Maurice and Striffing M., **Visibilité et brouillard.** [Visibility and fog.] Paris, Office National Météorologique, 1937. 112 p. 16 figs., tables, refs. **DWB**—A thorough study of the visibility problem with a most complete bibliography. Theory of visibility and principles of its measurement are analyzed in detail. The authors discuss the problem of horizontal, vertical and slight visibility measurements by means of instruments (photographic and electric) or by visual observation. In the second part, the problem of water vapor condensation in the atmosphere and different methods for measuring water particles are studied. *Subject Headings:* **1. Physics of visibility 2. Visibility measurement techniques 3. Fog 4. Condensation.**

3I–104 551.591.31:551.553:551.575/76(931)

*New Zealand. Meteorological Office, **Monthly frequency tables, containing observations of horizontal visibility, height of base of low cloud and speed and direction of surface and upper winds in the form approved by the International Commission for Air Navigation. August 1937–December 1937.** Wellington, New Zealand, 1937. tables. Microfilm. **DWB**—*Subject Headings:* **1. Visibility data 2. Cloudiness 3. Winds 4. New Zealand.**

3I–105 551.591:551.588.7

Reidat, R., **Über den Einfluss der Stadt auf die Sicht über dem Tempelhofer Feld.** [On urban influence on visibility over the Tempelhof airfield.] *Germany. Reichsamt für Wetterdienst, Erfahrungsberichte,* New Ser., Pt. 3:89–93, 1937. **DLC**—The study shows that Berlin has a great effect on visibility in the region of Tempelhof airfield. Lowest visibility is observed during NEly, Ely and SSWly winds (influence of big plants and railroad station). Airplane observations made it clear that the mist from Berlin can expand up to 50 km in a horizontal direction and up to 2 km in a vertical direction. *Subject Headings:* **1. Visibility 2. Urban influences 3. Berlin, Germany.**

3I–106 551.508.92

†Stange, Rudolf, **Messungen mit dem Bergmannschen Sichtmesser.** [Measurements with Bergmann's visibility meter.] *Leipzig. Universität. Geophysikalisches Institut, Veröffentlichungen,* 2nd Ser., 8:5:287–345, 1937. 15 figs., 7 tables, 22 refs. **DWB**—Description of the visibility meter and analysis of numerous experimental observations made under different degrees of transparency, of atmospheric brightness, etc. Relation between visibility and turbidity is also discussed. *Subject Heading:* **1. Visibility meters.**

3I–107 551.591.32/6:629.13(43)

*Stobe, W., **Das Flugwetter in Winter.** [Flying weather in winter.] *Germany. Reichsamt für Wetterdienst, Erfahrungsberichte,* New Ser., Pt. 3:55–64, 1937. tables. **DLC**—Review of visibility and fog variations during winter in Furth, Halle, Hof, Frankfurt a.M. and Munich with tables for Nov., Dec., Jan. and Feb. 1927–1929. *Subject Headings:* **1. Annual visibility variations 2. Flying weather 3. Slant visibility 4. Germany.**

3I–108 551.591.2/3

*Stobe, W., **Der Gang der Tag- und Nachtsicht.** [Variations of day and night visibility.] *Germany. Reichsamt für Wetterdienst Erfahrungsberichte,* New Ser., Pt. 3:140–145, 1937. tables, refs. **DLC**—An analysis of hourly observations made in Nurnberg. Describes the peculiarities of daily variations during winter and summer. *Subject Headings:* **1. Diurnal visibility variations 2. Night visibility 3. Nürnberg, Germany.**

1938

3I–109 551.591.3:551.506(43)

*Berg, Hellmut, **Ergebnisse 25 jähriger Sichtbeobachtungen auf dem Königstuhl bei Heidelberg.** [Results of 25 years of visibility observations from the Königstuhl near Heidelberg.] *Germany. Reichsamt für Wetterdienst, Wissenschaftliche Abhandlungen,* 5:5, 1938. 19 p. 6 figs., 10 tables, 10 refs. **DWB**—A model study of visibility, making use of remarkable series of observations from the Königstuhl near Heidelberg. From 1898 to 1923, Prof. Max Wolf made regular observations with 22 objectives (ranging from 0.6 to 98 km distance and from 88 m to 880 m elevation). Some of these were industrial cities (Mannheim and Worms) while others were peaks. All are shown on a chart of the yearly mean percent visibility. Tables and graphs show the annual and diurnal variation of visibility of each objective, and the monthly frequency of various visibility ranges (by 10 km intervals). Tables giving effect of wind direction, air mass and secular change over the 25-year period are presented and discussed. In general, poorest visibility occurred in winter and the best in June and August; the best in summer in the afternoon and the best in winter in the morning; the best with east winds, except that visibility of the cities in the valley was best with a north wind. In the latter case, there was a worsening of visibility from 1899 to 1906, after which no change was

noted. (Same as *MAB* 9–148, Sept. 1950.) *Subject Headings:* **1. Visibility variations 2. Long period records 3. Rhine Valley 4. Heidelberg, Germany.**—*M.R.*

3I–110 551.591.1:551.508.9

†Foitzik, Leonhard (*Lindenberg*), **Über die Lichtdurchlässigkeit der stark getrübten Atmosphäre im sichtbaren Spektralbereich.** [Transmission of light in the visible spectrum through a very turbid atmosphere.] *Germany. Reichsamt für Wetterdienst, Wissenschaftliche Abhandlungen* 4(5), **1938.** 31+p. 31 figs., 8 tables, 40 refs., 35 equations, append. **DLC**—The transmissibility of a very turbid atmosphere to light of varying wave length was investigated with a Koschmieder-Zeiss night visibility meter. Effect of scattered light upon visibility measurements is analyzed theoretically and a relationship is established between scattered and direct light. The theoretical principles underlying the apparatus, its calibration and operation are discussed. Visibility measurements were made with red, yellow, green and blue filters; influence of normal and abnormal turbidity and dependence of extinction coefficient upon wave length are analyzed. Influence of meteorological factors, such as climate of locality of observations, atmospheric particles and wind direction upon turbidity properties of atmosphere are considered. The experimental measurements are compared with the theoretical work of STRATTON and HOUGHTON on water clouds. The range of colored lights at night is calculated and tables for varying turbidity conditions and light intensities are given. There is appended a theoretical discussion of the visibility of large objects. (Same as *MAB* 2.2–15, Feb. 1951.) *Subject Headings:* **1. Visibility measurements 2. Transmission of light 3. Turbidity.**—*I.L.D.*

3I–111 551.591.1:551.508.9

†Koschmieder, Harald, **Luftlicht und Sichtweite.** [Light and visibility.] *Naturwissenschaften* 26(32):521–528, Aug. 12, **1938.** 6 figs., tables, 28 refs., equations. **DLC**—A critical review on the mathematical relations determining the range of vision. The author describes his own experimental observations made in the Baltic Sea with special white and black screens in different weather conditions and with screens of varying brightness. *Subject Headings:* **1. Visibility observation 2. Koschmieder's method.**

3I–112 551.591.36

Lamb, H. H., **Estimating the remoteness of observed cloud features.** *Meteorological Magazine* London, 73(875):293–294, Dec. **1938.** fig., ref. **DLC**—Visibility is normally better in the free air than near the earth's surface. Better visibility conditions near the surface are found in polar regions. WATKINS observed visual range of 250 miles during the expedition to Greenland in 1930. *Subject Heading:* **1. Exceptional visibility.**

3I–113 551.591:551.56

Löhle, Friedrich, **Über die Schätzung der Sichtweite.** [Evaluation of visibility.] *Meteorologische Zeitschrift*, 55(2):54–61, Feb. **1938.** fig., 5 tables, 15 refs., equations. **MH-BH**—A study of conditions important to visibility measurement. Author emphasizes the dependence of accurate measurement on contrast sensibility of the human eye and the size and color of observed object. A special comparison of various scales used for visibility observations (international, English, German and others) is presented. *Subject Headings:* **1. Visibility 2. Visibility scales.**

3I–114 551.508.

Piskun, V. F., **Novyĭ metod opredeleniia dal'nosti vidimosti i koeffitsienta ekstinktsii sveta v prizemnon sloe atmosfery.** [A new method of determining the range of visibility and the extinction coefficient in the air layer near the ground.] *Meteorologiia i Gidrologiia*, 4(4):21–32, April 193 2 figs., ref., 39 equations. English summary p. 31–32. **DLC**—Description of three methods of visibility determination used by the author. Data used were taken from observations of screens composed of black and white rectangles, located at different distances from the point of investigation. Visibility conditions and the influence of haze, mist and brightness of the air on visual range are analyzed mathematically. *Subject Headings:* **1. Visibility meters 2. Visibility measurement techniques.**

3I–115 551.591(4

Twist, T. F., **Visibility of the West Somerset Coast.** *Meteorological Magazine*, London 73(875):293–294, Dec. **1938.** **DLC**—Short description of visibility conditions and their relation to velocity and wind direction. *Subject Headings:* **1. Visibility 2. Somerset Coast, England.**

3I–116 551.591:551.508.

Zikeev, Nikolay T., **Raboty po metodike opredeleniia vidimosti v Rostovskoĭ Geofizicheskoĭ Observatorii.** [Methodology of visibility observations at Rostov Geophysical Observatory

(In: Vzesoiuznaia Aktinometricheskaia Konferentsiia 15–21 noiabria 1938. G.G.O. Stenograficheskii otchet. Leningrad, 1938.) Review in: *Meteorologiia i Gidrologiia*, No. 11/12:162, 1938. **DLC, DWB**—Report made before the National Actinometric Conference. Experimental observations were carried out under author's supervision at the observatory in 1937–1938. Purpose of the investigation was to develop methods of visibility measurement for the network of meteorological stations where complex installations or costly instruments could not be used. The range of vision for black and white discs with various diameters on black, gray or white background, color strips, etc., was studied systematically. The analysis of these observations furthered the development of the study of the interrelation between visibility and numerous physical and physiological factors. It was also found that a screen with different widths of yellow and black stripes, located at a distance of about ½ mile, can be used as a good indicator of turbulence in the layers near the ground. A new visibility meter was constructed by the author. Two identical lenses with diaphragms are placed at a small angle in a camera having on the other side an etched glass. Visibility is determined by measuring brightness difference between two white screens located at different distances from observer. Disposal of these screens and the angle between lenses in the camera were selected so that the distance between screen images on etched glass would be as small as possible. The brightness of the nearest screen is diminished by means of a diaphragm to the brightness of the distant screen and the relationship of the diameters of the lens gives data for visibility calculation. *Subject Headings:* **1. Visibility measurement techniques 2. Visibility meters.**

1939

3I–117 551.591.32(268)

*Berezkin, Vl. A., **Vidimost' v more Laptevykh.** [Visibility over the Laptev Sea.] *Problemy Arktiki*, Leningrad, 1(2):38–45, May **1939.** maps, tables, equations. **DLC**—An analysis of methods then in use for the determination of visibility. Report on results of visibility observations made over the Laptev Sea region during Sept. 1935–1936. Maps of mean visual range from each month (based on observations at 9 polar meteorological stations) are presented. *Subject Headings:* **1. Visibility observations 2. Annual visibility variations 3. Laptev Sea 4. Soviet Arctic.**

3I–118 551.591:551.508.92

Gold, Ernest, **A practical method of determining the visibility number V at night.** *Royal Meteorological Society, Quarterly Journal*, 65(280):139–164, April **1939.** 2 figs., 5 tables, refs. Discussion p. 159–164. **DWB**—Description of the visibility meter constructed by the author. A neutral light filter used in the instrument can reduce the intensity of light to 1/10,000th of its incident value. Visibility range is determined from observations of lights at a fixed distance smaller than the actual distance of visibility. *Subject Headings:* **1. Visibility meters 2. Gold's visibility meter.**

3I–119 551.591.2:551.575(74/77)

*Harrison, H. T., **Terminal weather on the Chicago–New York airway.** Chicago, United Air Lines Transport Corp., **1939.** 20 p. 35 figs., 6 refs. **DWB**—Analysis of local effects which should be considered before the issuance of a short period forecast and relative frequency of adverse flying weather conditions. The characteristics are given for three airfields: Chicago, Cleveland and Newark on the basis of observations beginning in 1930. Following data for visibility are presented: monthly and annual means of days with visibility less than ½ mile, ¾ mile and 1¼ mile (dense fog). *Subject Headings:* **1. Poor visibility 2. Fog 3. Weather conditions 4. Airways forecasting 5. Chicago, Ill. 6. Cleveland, Ohio 7. Newark, N. J.**

3I–120 551.591.1

Mecke, R., **Beiträge zur Sichtmessung.** [Contributions to visibility measurement.] *Meteorologische Zeitschrift*, 56(10):369–372, Oct. **1939.** 4 refs., equations. **MH-BH**—A theoretical study on physical and physiological problems of visibility measurement (brightness of objects and background, color of objects, contrast sensibility of the human eye, visibility in shade, etc.) *Subject Headings:* **1. Physics of visibility 2. Physiological factors in visibility.**

3I–121 550.510.42:551.555

Morris, David R., **Air pollution and weather.** New York, **1939.** 3 p. 7 figs. **DWB**—Causes and results of air pollution. Concept of shade-miles. Relation of density of particles to wind. Variations of smoke with season and time of day. (Same as *MAB* A–94, Jan. 1950.) *Subject Headings:* **1. Atmospheric pollution 2. Weather conditions 3. Visibility.**—*H.P.K.*

3I–122 551.591:508.92

Piskun, V. F., **Primenenie fotometricheskogo ekrana dlia opredeleniia mutnosti atmosfery.** [Application of photometric screens to determine atmospheric turbidity.] *Meteorologiia i Gidro-*

logiia, 5(9):100–101, **1939,** fig., 3 refs. **DLC**—Author proposes a modification of the photometri screen for observations of atmospheric turbidity. The screens must have clear spaces instead c white triangles for turbidity observations. *Subject Headings:* **1. Visibility observation technique 2. Turbidity 3. Visibility.**

3I–123 551.591.1:551.574.

Wright, H. L., **Atmospheric opacity: study of visibility observations in the British Isles.** *Roya Meteorological Society, Quarterly Journal*, 65(281):511–439, July **1939.** 5 figs., 9 tables, 31 refs equations. **DLC**—A detailed summary of investigations made by the author on visibility condition over England. The author discusses methods for calculating values of opacity under clear an foggy conditions. Tables give the opacity in clear air (visibility 5 to 9) and in fog (visibility 0 to 4 and also the percentage frequency of visibility from 0 to 4, for the period 1927–1936 at numerou points in England. *Subject Headings:* **1. Visibility 2. Opacity of air 3. Fog 4. England.**

1940

3I–124 551.575:551.591.2:629.13(73

*Knight, Robert W., **Low visibility airport windrose summaries.** *U. S. Civil Aeronauti Authority. Technical Development Note*, No. 22, July **1940.** [n.p.] figs., diagrs., tables. **DWB**— Wind and climatic conditions during periods of restricted visibility over the United States ar analyzed. The observational data for a period of five years (1934–1938) are tabulated and presente in detail in numerous tables and diagrams. Comprehensive study for use in planning airport run ways and air navigation. *Subject Headings:* **1. Visibility data 2. Fog 3. Aerial navigatio 4. United States.**

3I–125 551.591.1:551.50

Löhle, Friedrich, **Über die Anleitung zur Sichtschätzungen.** [Introduction to visibilit estimates.] *Zeitschrift für angewandte Meteorologie*, 57(2):37–49, Feb. **1940.** 3 figs., refs. **DWB**— Visibility as a meteorological factor and its dependence on synoptic situations are discussed. Autho also notes relation between reliability of visibility determination and contours, color, brightness c visibility markers and their background. *Subject Headings:* **1. Physics of visibility 2. Visibilit observation techniques.**

3I–126 551.591.6(4

*†Löhle, Friedrich, **Über die prognostische Bedeutung der Schichtung des Dunstes.** [O importance of mist stratification for forecasting.] *Meteorologische Zeitschrift*, 57(2):73–79, Fe **1940.** 4 figs., 19 refs. **MH-BH**—Description of typical characteristics of atmospheric turbidit over Central Europe from airplane observations at altitudes up to 2000 m. Weather condition accompanying various forms of turbidity and visibility variations are discussed. *Subject Heading* **1. Slant visibility 2. Vertical visibility 3. Visibility from airplanes 4. Weather condition 5. Central Europe.**

3I–127 551.508.92 551.593

Löhle, Friedrich, **Über die Messung des mittleren Zerstreuungskoeffizienten und seine spektralen Abhängigkeit auf dem Hohen Sonnblick.** [On the measurement of the mean coefficien of scattering and its spectral relations on the High Sonnblick.] *Beiträge zur Physik der freie Atmosphäre*, 27:38–48, **1940.** 3 figs. **DWB**—Discusses observations of visibility with a photomete according to weather type, and daily variation. (Same as *MAB* 2K-230, Nov. 1951.) *Subje Headings:* **1. Mountain meteorology 2. Visibility 3. Sonnblick, Austria.**—*C.E.P.B.*

3I–128 551.509.39:551.591.3

Löhe, Friedrich, **Über Fernsichten.** [On distance visibility.] *Annalen der Hydrographie un Maritimen Meteorologie*, 68(6):194–200, June 15, **1940.** 4 figs., table, refs. **DLC**—A study of th relation between distance visibility and different physical and physiological factors. The autho reviews records of distance visibility: the maximum distance observed up to date was 530 km (Köl Mt. Blanc), other records were 310 km (Mt. Blanc-Puy de Dôme), 240 km (Höchenschwandt-M Blanc), 200 km (Atlantic-Peak of Tenerife). *Subject Headings:* **1. Exceptional visibility 2. Visibilit of mountains.**

3I–129 551.508.9

Schallenberger, G. D. and Little, E. M., **Visibility through haze and smoke and a visibilit meter.** *Optical Society of America, Journal*, 30(4):168–176, April **1940.** 11 figs., 7 refs., 13 equation **DLC**—Visibility range as observed in the presence of small smoke columns. The six independen variables (height of smoke layer, altitude of sun, angle between the smoke column and the su

size of the smoke layer, power of binoculars and air clarity) and their interrelations are investigated. Authors describe in detail their own visibility meter adopted by the U. S. Forest Service in 1937. *Subject Headings:* **1. Visibility in smoke 2. Visibility meters.**

3I–130 551.591.31/32:551.575:551.553/57

*South Africa. Meteorological Office. **Monthly frequency tables, containing summaries of observations of horizontal visibility, height of haze of low cloud and speed and direction of surface and upper winds in the form approved by the International Commission of Air Navigation. Aug. 1932–May 1940** ((Sept. 1939 lacking). Pretoria, **1932–1940.** [n.p.] tables. **DWB**—Tables of frequency of horizontal visibility at 0630 h, 1130 h and 1900 h G.M.T., and days of fog (visibility below 1000 m). The data for heights of low clouds and wind observations near the earth's surface are given for the same periods. Upper winds at heights of 500, 2000 and 4000 m were observed only at 1300 G.M.T. *Subject Headings:* **1. Visibility data 2. Cloud height 3. South Africa.**

3I 131 551.591:551.575(491/988)

*Wilhelmshaven, Germany. Marineobservatorium, **Schlechte Sicht bei Island und Ost Grönland. Beitrag zur Frage des Auftretens von Nebel und schlechter Sicht durch Niederschlag im Seegebiet von Island und Ost Grönland.** [Poor visibility near Iceland and East Greenland. A contribution to the problem of fog and poor visibility caused by precipitation in the sea area near Iceland and East Greenland.] Hamburg-Altona, Oberkommando der Kriegsmarine, **1940.** 20 p. 10 plates (charts, tables). **DWB**—Summary of observations made during 1926–1938 at 7 stations. Monthly frequency of visibility and dependence of poor visibility on fog and precipitation are given in tables and diagrams and discussed. *Subject Headings:* **1. Visibility observations 2. Visibility in fog 3. Poor visibility 4. Iceland 5. East Greenland.**

1941

3I–132 551.591.1:551.575(74)

*George, Joseph Johnson and Ellett, M. W., **A study of fog and low ceilings for Washington Airport.** U. S. Weather Bureau, **1941.** 22 p. 5 figs., 3 tables, refs. **DWB**—On the basis of records for the years 1935 to 1940, the author investigated all types of fog (pre-warm frontal, radiation and advection) and compared the distribution of fog and low ceilings with analogous data for Philadelphia and Richmond. (Same as *MAB* 3E–46, May 1952.) *Subject Headings:* **1. Fog 2. Ceiling heights 3. Poor visibility 4. Airways forecasting 5. Washington, D. C. I. U. S. Weather Bureau.**

3I–133 551.591.1:551.575(74)

*George, Joseph Johnson and Ellett, M. W., **A study of local weather conditions and their forecasting at Pittsburgh Airport.** U. S. Weather Bureau, **1941.** 12 p. 2 figs., 2 tables. **DWB**—Synoptic conditions of poor visibility ($\frac{1}{2}$ mile or below), low ceiling (600 ft or below) and fog are analyzed and discussed. The data of average number of hours per month with low ceiling and poor visibility are given in tables and diagrams. *Subject Headings:* **1. Poor visibility 2. Ceiling heights 3. Fog 4. Airways forecasting 5. Pittsburgh, Penna. I. U. S. Weather Bureau.**

3I–134 551.591(47)

Germany. Oberkommando des Meeres, **Die klimatischen Verhältnisse des europäischen Teiles von Russland unter besonderer Berücksichtigung der Verhältnisse im Winter.** [Climatic conditions of European Russia with special consideration of winter conditions.] October **1941.** 13 p. 17 figs., 3 tables. **DWB**—On p. 7 entitled "Sicht" (visibility) a brief review of visibility conditions is given. *Subject Headings:* **1. Visibility 2. European U.S.S.R.**

3I–135 551.591.2/3(73/9)

*Harrison, H. T., **Terminal weather conditions.** Chicago, United Air Lines Transport Corporation, **1941.** 75 p. figs., tables. **DWB**—Characteristics of flying conditions for numerous points of the United States. The author studied the effects of adjacent bodies of water, orography and effects of local drainage upon radiation fog and causes of poor visibility (of 0 to 1 mile) during winds of 0 to 5 m.p.h. in fog, smoke, rain, dust and snow. The author also considers the questions of local modification of air masses, sources of smoke, pollution and outstanding synoptic types which produce adverse weather. *Subject Headings:* **1. Poor visibility 2. Flying weather 3. United States.**

3I–136 551.591.1 551.501.1

†Löhle, Friedrich, **Sichtbeobachtungen vom meteorologischen Standpunkt.** [Visibility observations from the meteorological standpoint.] Berlin, Julius Springer, **1941.** 119 p. 45 figs., 28 tables, 99 equations. **MH-BH**—Fundamental study of the problem of visibility. The author studied the physical conditions of visibility in relation to various weather situations, local conditions

and also to physiological state of the observer. Special attention is paid to visibility forecasting and to visibility as an important factor in aviation. The theory of visibility and conditions of visibility at night are discussed. The author describes the construction of the principal visibility meters constructed earlier and analyzes conditions of visibility in infrared region of the spectrum. *Subject Headings:* **1. Visibility 2. Night visibility 3. Visibility of infrared radiation 4. Visibility meters.**

3I–137 551.506.1:551.506.7:551.591(598)

*Thailand. Meteorological Dept., **Monthly frequency tables of horizontal visibility, surface and upper winds.** Jan. **1938**–Sept. **1941.** 1 v. per month. 18 p. per v. **DWB**—Frequency tables summarizing 0000 and 0600 G.M.T. observations of visibility within specified limits and surface wind by direction and velocity groups for 16 stations in Thailand. Upper wind frequencies for 4 stations are given for the 2300 and 0500 observations for 500, 1000, 2000 and 3000 meters for 5 velocity groups. *Subject Headings:* **1. Visibility frequencies 2. Wind data 3. Upper air wind frequencies 4. Climatic data.**—*M.R.*

3I–138 551.591.31:551.553:551.576(431/5)

Wilhelmshaven, Germany. Marineobservatorium, **Monatskarten für Mai, Juni, Juli, August, September, Oktober: Wind, Sturm, Sicht, Nebel und Bewölkung in der Biscaya.** [Monthly charts for May, June, July, August, September, October: wind, storm, visibility, fog and cloudiness in the Bay of Biscay.] Wilhelmshaven, **1941.** [n.p.] figs., tables. **DWB**—The characteristics of frequency for each element are presented. The values of visibility and its frequency for 4 categories of visibility: 0–3, 4–5, 6–7 and 8–9. *Subject Headings:* **1. Visibility data 2. Fog 3. Wind charts 4. Bay of Biscay.**

1942

3I–139 551.591.1:551.508.92

Berezkin, Vsevolod A., **Ob usovershenstvovanii metodiki nabliudenii nad vidimost'iu.** [On improvement of methods of visibility observation.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 6(3):121–123, **1942.** 2 equations. **DLC**—Factors influencing the measurement of visibility and defects of the visibility meters used at present are taken up. *Subject Headings:* **1. Physics of visibility 2. Visibility meters.**

3I–140 551.591.1

†Faas, V. A., **Spektral'naia prozrachnost' atmosfery i vidimost'.** [Spectral transparency of the atmosphere and visibility.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 6(4):176–185, **1942.** 2 figs., tables, 19 refs., equations. **DLC**—A review of previous works. The author considers the relation between visual range and extinction coefficient and analyzes the visibility conditions for different spectral zones in normal weather and in fog. Since 1936, he has studied visibility conditions of polarized light and has constructed a special camera for photographic measurement of polarization from aircraft. Observations show that the range of visibility can be increased up to 15% by polarization. *Subject Headings:* **1. Spectral transparency of atmosphere 2. Visibility of polarized light 3. Extinction coefficient.**

3I–141 551.591(65,611)

*Frankel, Morris Herbert, **Visibility data for selected stations in Algeria and Tunisia.** U. S. Weather Bureau, **1942.** 7 p. tables. **DWB**—*Subject Headings:* **1. Visibility data 2. Algeria 3. Tunisia. I. U. S. Weather Bureau.**

3I–142 551.591.2:551.575(495,496)

*Germany. Reichsamt für Wetterdienst, **Flugklimatologie. Balkan, Griechenland, Westen Turkei.** [Aviation climatology. Balkans, Greece, Western Turkey.] v. 2. [1942?] 17 p. +9 maps, tables entitled "Sicht und Nebel" (Visibility and fog). **DWB**—Description of visibility and fog conditions over the Balkan peninsula and characteristics of their variations. The relation between wind direction and visibility is analyzed and the probability of visibility depending on wind direction is given for summer in a table. *Subject Headings:* **1. Visibility frequencies 2. Fog.**

3I–143 551.591.1

Gribanov, A. I., **Koeffitsient ekstinktsii i vidimost' v prozhektorom luche.** [Extinction coefficient and visibility in a searchlight beam.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geog. i Geofiz.*, 6(4):169–171, **1942.** fig., 3 equations. **DLC**—Author discusses the problem of night visibility and concludes that the extinction coefficient and coefficient of atmospheric reflection are the most important factors for searchlight technique. *Subject Headings:* **1. Night visibility 2. Extinction coefficient.**

3I–144 551.508.92

Gul'nitskiĭ, L. V. and Anisimov, V. K., **Novyĭ izmeritel' vidimosti.** [New visibility meter.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 6(3):110–115, **1942.** 2 figs., 22 equations. **DLC**—Description of the construction and operation of a new instrument constructed at the geophysical observatory at Minsk. The authors developed 3 photoelectric and one contrasting method of visibility measurement. *Subject Headings:* **1. Visibility measurement 2. Visibility meters.**

3I–145 551.591:656.7

Houghton, Henry G., **The transmission of light in the atmosphere with application to aviation.** *Journal of the Aeronautical Sciences*, 9(3):103–107, Jan. **1942.** fig., table, 13 refs., 5 equations. **DLC**—The transmission of light through the atmosphere is determined by the absorption and scattering which it undergoes. It is shown that absorption is negligible in the visual spectrum but becomes increasingly strong in the infrared. Scattering is due to suspended particles ranging in size from air molecules to rain drops. The scattering coefficient changes with wave length or color of the light only when the scattering particles are smaller than the wave length. Visual range is determined largely by the scattering coefficient of the atmosphere. *Subject Headings:* **1. Physics of visibility 2. Spectral transparency of atmosphere.**—*From author's abstract.*

3I–146 551.591:551.508.92

Krylov, Nikolaĭ K., **Issledovniia po gorizontal'noĭ i vertikal'noĭ vidimosti Rostovskoĭ Geofizicheskoĭ Observatorii.** [Investigations of the Rostov Geophysical Observatory on horizontal and vertical visibility.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geog. i Geofiz.*, 6(3):90–92, **1942.** 2 figs., 2 refs. **DLC**—Report on experiments made during 1940 in Rostov on Don. More than 1000 series of observations were carried out to determine visibility. The relation between visibility and size of black objects, and the variations in contrast sensitivity of the human eye were studied. Some observations on visibility of white and black platforms (200 square meters each) were made from airplanes, when the observer marked the altitude on which the differences of brightness between white and black platforms faded away. A short description of an instrument for measuring the brightness of black objects is also given. *Subject Headings:* **1. Horizontal visibility 2. Vertical visibility 3. Visibility observation techniques 4. Visibility from airplanes 5. Rostov-on Don, U.S.S.R.**

3I–147 551.591:551.506:551.576(7/8)

*Rigby, Malcolm, **Cloud ceiling and visibility data for North and South America.** *U. S. Weather Bureau. Special Report*, No. 88, **1942.** 21 p. tables. **DWB**—Visibility data for coastal stations of North and South America from observations at 8 a.m. are given. The work also contains numerous tables of number of days with dense fog, mean cloudiness and mean data of clear days. *Subject Headings:* **1. Visibility data 2. Fog 3. Cloudiness 4. North America 5. South America.**

3I–148 551.591.1:551.508.92:551.591.6

†Sharonov, Vsevolod Vasil'evich, **Metody i pribory dlia izmereniia prozrachnosti atmosfery.** [Methods and instruments for measuring atmospheric transparency and visibility.] *Akademiia Nauk. SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 6(3):65–80, **1942.** 47 refs., 31 equations. **DLC**—A critical review of the problem. The author discusses in detail the theory and practice of visibility calculation and measurement. Night, vertical and slant visibility are also considered. *Subject Headings:* **1. Physics of visibility 2. Visibility meters 3. Vertical visibility 4. Slant visibility 5. Night visibility.**

3I–149 551.508.92

Sharonov, Vsevolod Vasil'evich, **Praktika primeneniia izmeriteleĭ vidimosti.** [Manner of using visibility meters.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 6(3):104–109, **1942.** 4 figs., table, equations. **DLC**—An analysis of the physical and physiological principles of instruments used for measuring visibility. Detailed description of the new visibility meter, "dymkometer" (haze meter), constructed by the author. *Subject Headings:* **1. Visibility meters 2. Visibility measurement techniques.**

3I–150 551.591

Sytinskaia, N. N., **O rabotakh astronomicheskoĭ observatorii LGU po fiziologicheskim svoĭstvam glaza.** [Work done by the LGU (Leningrad State University) astronomical observatory on the physiological properties of the eye.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 6(3):116–120, **1942.** 6 figs., 4 refs., equations. **DLC**—An experimental study on the contrast sensitivity of the human eye (ϵ). A value of ϵ was determined by more than 40 observers by means of a large black screen. The mean of ϵ was found to be 1.48 with great individual variations in limits from 0.5

up to 2.5. Better visibility is observed for compact black objects on white background. *Subject Headings:* **1. Contrast threshold 2. Visibility 3. Visual acuity.**

3I–151 551.591 551.591.6(42)

*U. S. Air Weather Service, **Climate and weather of the British Isles.** *U. S. Air Weather Service, Publications*, 6(2), Nov. **1942.** 126 p. figs., tables. **DLC**—In a section entitled "Obstruction to visibility" (pp. 37–52 with 7 figs., 3 tables) a comprehensive description of visibility conditions over the British Isles is presented. Maritime climate of this area with a greater frequency of fog, mist, haze and low clouds and artificial causes such as the pollution of the lower atmosphere by smoke, concentrated factories and homes form the special conditions of visibility. The problem of visibility in that area is discussed in a general way. The monthly and diurnal variations, the distribution of vertical visibility with elevation, the occurrences of very poor and good visibility are given and analyzed. The effect of smoke on visibility is given special consideration. *Subject Headings:* **1. Visibility data 2. Vertical visibility 3. England.**

3I–152 551.591

Vetter, Ernest G., **Visibility unlimited.** New York, William Morrow and Co., **1942.** 352 p. figs., tables, refs. **DLC**—An introduction to the science of weather and the art of practical flying. On p. 70, 71, 126, 127 and 148, items on visibility will be found; its importance to the safety of the Air Weather Service is given. *Subject Headings:* **1. Visibility 2. Aeronautical meteorology 3. Textbooks.**

3I–153 551.591.31/32(42)

*Walters, A., **An analysis of cloud height and visibility at Mount Batten.** *Great Britain. Meteorological Office. Aviation Met. Report*, No. 14, **1942.** 7 p. 10 figs., tables. **DWB**—The relation between wind direction and frequencies of visibility and cloud height is analyzed. Summary of observations during five years (1931–1937) with visibility data, is given. *Subject Headings:* **1. Visibility frequencies 2. Visibility 3. Wind direction 4. Cloud height 5. Mount Batten, England.**

1943

3I–154 551.591.1:551.575

Bricard, J., **Sur la visibilité des objets á travers le brouillard.** [On visibility of objects in fog.] *Académie des Sciences, Paris, Comptes Rendus*, 216:644–646, May 10, **1943.** fig., 9 refs., equation. **DLC**—Fog is an important factor in visibility. The author's investigation showed that the limit of visibility of dark objects usually has the same limit as visibility in fog when their angular dimensions are not less than 0.3°. *Subject Heading:* **1. Visibility in fog.**

3I–155 551.591(79)

*Copeland, J. A., **Ceiling and visibility data for selected stations along the Pacific Coast.** *U. S. Weather Bureau, Special Report*, No. 344, **1943.** 54 p. figs., tables. **DWB**—*Subject Headings:* **1. Visibility data 2. Ceiling data 3. Pacific Coast, United States.**

3I–156 551.591(44,46,469)

*Copeland, J. A., **Ceiling and visibility data for Southern France, Portugal and Spain.** *U. S. Weather Bureau, Special Report*, No. 227. [n.d.] 38 p. tables. **DWB**—*Subject Headings:* **1. Visibility data 2. Ceiling data 3. France 4. Portugal 5. Spain.**

3I–157 551.591.2(479)

*Germany. Reichsamt für Wetterdienst, **Flugmeteorologische Übersicht über Transkaukasien.** [Aviation weather survey over Transcaucasia.] Berlin, **1943.** 256 p.+29 charts, numerous tables. **DWB**—This work, issued for official use only, contains exhaustive summary of more important data for Transcaucasia. On pp. 250–251, entitled "Nebel und Sicht" (Fog and visibility), two tables with data of visibility less than 1 km and less than 4 km at 8 a.m. (mean for period 1932–1936) are presented. The stations used for study of vision range were located on Caspian and Black Sea coasts, in interior regions of Transcaucasia and in Northern Caucasus. *Subject Headings:* **1. Visibility data 2. Aeronautical climatology 3. Caucasus, U.S.S.R.**

3I–158 551.591.31/32(469)

*Gomes de Seica e Santos, Vitorino, **Algumas notas sôbre a visibilidade em Coimbra.** [Notes on visibility at Coimbra.] Coimbra, Portugal, **1943.** 32 p. plate, 15 tables, refs. **DWB**—Summary of visibility observations made during 1930–1942. The observations were carried out by visual determination of the visibility range and with Wigand's visibility meter. The daily and annual variations of visibility are discussed and frequencies of visibility for each month 1930–1942

are given in tables. *Subject Headings:* **1. Visibility frequencies 2. Visibility variations 3. Coimbra, Portugal.**

3I–159 551.591.1:551.521.3

Kuznetsov, E. S., **Teoriia negorizontal'noĭ vidimosti.** [Theory of non-horizontal visibility.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 7(5):247–336, **1943.** English summary p. 328–336. 6 refs., 294 equations. **DLC**—A comprehensive study of visibility conditions for cases when the observer and the object are situated at different horizontal levels. The author revises the theory of horizontal visibility and investigates the distribution of the coefficient of absorption and scattering with height, the form of the index of scattering, the boundary conditions and the albedo of the earth's surface. The author proposes a new theory for determination of visibility of black and non-black objects. The physical basis of the theory is the equation for the transfer of radiation. The calculation of visibility range is given for two cases, i.e., a case when observer is situated above the object and when he is below the object. *Subject Headings:* **1. Physics of visibility 2. Physiological factors in visibility.**

3I–160 551.591.1

Linke, F., **Bemerkungen zu E. O. Hulburts, "Optik des atmosphärischen Dunstes."** [Remark on Hulburt's "Optics of atmospheric haze."] *Meteorologische Zeitschrift*, 60(12):416–419, Dec. **1943.** 2 tables, 2 refs. **MH-BH**—Hulburt's formulas for visibility determination in haze are examined critically with application of Koschmieder's formulas. *Subject Headings:* **1. Visibility 2. Visibility in haze 3. Reviews.**

3I–161 551.591:551.575(94)

*Loewe, Fritz, **Coastal fogs in Australia.** *Australia. Meteorological Branch, Bulletin*, No. 31 [**1943**]. 19 p. figs., tables. **DWB**—A statistical summary of low visibility at coastal stations is presented. It is mainly observed during morning hours. The seasonal frequency of visibility less than 1 km and diurnal percentage distribution are given in tables and some hints for forecasting poor visibility are offered. *Subject Headings:* **1. Visibility data 2. Fog 3. Visibility forecasting 4. Australian coasts.**

3I–162 551.591.1

Lossnitzer, H., **Sichtmessungen mit Halbleiterzellen.** [Visibility measurement with semiconductive cells.] *Zeitschrift für angewandte Meteorologie*, 60(11):341–344, Nov. **1943.** 5 tables, 4 refs. **DWB**—Report on special observations of visibility and its relation to various weather conditions and optical phenomena. The influence of daily variations of meteorological elements and especially cloudiness and color of the sky are investigated. *Subject Headings:* **1. Visibility measurement techniques 2. Brightness of horizon 3. Weather conditions.**

3I–163 551.591.1 551.508.92

Martynov, D. IA., **Ob instrumental'nom opredelenii dal'nosti vidimosti v gorizontal'nom napravlenii.** [On instrumental determination of visibility in a horizontal direction.] *Kazan'. Gosudarstvennyĭ Universitet. Uchenye Zapiski, Astronomiia*, 103(5):53–65, **1943.** 3 figs., tables, equations. **DBS**—The author derives several equations for computation of horizontal visibility and describes his own special instrument constructed for observations of visibility. This meter has a photometer with selenium cell and mirror galvanometer (sensitivity $0.9 \times 10)^{-9}$. The horizontal visibility is determined by photometric measurement of brightness of white and black shields. *Subject Headings:* **1. Visibility observation techniques 2. Visibility meters.**

3I–164 551.591:551.508.92

Sharonov, Vsevolod Vasil'evich, **Nabliudenie i vidimost'.** [Observation and visibility.] Moscow, Izdatel'stvo Akademii Nauk, **1943.** 76 p. 2 figs., 7 tables. **DLC**—Discussion of the physical and physiological factors important for visibility and a description of the author's visibility meter. Visibility conditions in turbid air (haze, fog, smoke, etc.), slant visibility by airplane observation, night visibility and visibility during moonlight, starlight and twilight are considered. *Subject Headings:* **1. Visibility 2. Visibility in fog 3. Slant visibility 4. Sharonov's visibility meter.**

3I–165 551.591.31/32:551.576

*U. S. Weather Bureau. **Occurrences of various ceiling heights and visibility limits for western Europe.** Washington, D. C., **1943.** 24 charts. **DWB**—Various visibility limits for morning, midday and evening are given by month for western Europe, Algeria and Tunisia. *Subject Headings:* **1. Visibility data 2. Ceiling data 3. Western Europe 4. Algeria.**

3I–166 551.510.42:551.591

Carney, Charles B., **Aids in forecasting minimum visibilities in smoke at La Guardia Field.** New York, April 8, **1944.** Mimeographed. table, diagrs. **DWB**—Need for consideration of smoke problem in weather forecasting. Smoke pollution relative to wind direction and velocity, stability, time of day and year, and relative humidity. (Same as *MAB* A–111, Jan. 1950.) *Subject Headings:* **1. Atmospheric pollution 2. Visibility forecasting 3. Weather conditions 4. La Guardia Field, N. Y.**

1944

3I–167 551.591.1:551.521.3

Dessens, Henri, **Relation entre l'absorption par l'atmosphère et la visibilité.** [Relation between atmospheric absorption and visibility.] *Académie des Sciences, Paris, Comptes Rendus,* 218:685–687, April **1944.** refs., equations. **DWB**—Theoretical discussion of problem with emphasis on color contrast. *Subject Headings:* **1. Physics of visibility 2. Color contrast 3. Atmospheric absorption.**

3I–168 551.510.42:551.591

Fletcher, Robert D. and Smith, Earl Dillon, **Meteorological factors affecting smoke pollution.** *Smoke Prevention Association of America, Proceedings,* Detroit, June **1944.** 6 p. 5 figs. **DWB**—Effects of advection, convection, inversions, etc., on visibility as affected by smoke. Possibilities of forecasting conditions favorable for pollution. (Same as *MAB* A–117, Jan. 1950.) *Subject Headings:* **1. Atmospheric pollution 2. Visibility 3. Weather conditions 4. Weather forecasting.**

3I–169 551.591.1:551.521.3

*Schmolinsky, F., **Die Wellenlängenabhängigkeit der Sichtweite und des Keoffizienten der Dunstextinktion.** [Dependence of visibility on wave length and mist extinction coefficient.] *Meteorologische Zeitschrift,* 61(6):199–203, June **1944.** 6 figs., table, 6 refs., 6 equations. **MH-BH**—A series of special visibility determinations for different wave lengths was carried out at Jena. These observations made by spectrophotometer are analyzed and discussed. Visibility range decreased with decreasing wave length; this phenomenon was more intensive under good visibility conditions. The results are in good agreement with investigation made by Knowles Middleton. *Subject Headings:* **1. Mist 2. Spectral transparency of atmosphere 3. Extinction Coefficient.**

3I–170 551.591.31/32:551.575(79)

*†U. S. Weather Bureau, **Incidence of low ceiling and low visibilities in the U. S. Pacific Coastal regions.** *U. S. Weather Bureau, Report,* No. 720, Nov. **1944.** 115 p. 36 figs., 18 tables, 34 refs. **DWB**—Brief survey of physiographical conditions and weather of the area during low ceiling and poor visibility. Data for average occurrence of low visibility average and greatest and least number of hours with low visibility are given and discussed. Characteristics of diurnal distribution of low visibility and average occurrence of dense fog are presented. *Subject Headings:* **1. Poor visibility 2. Fog 3. Ceiling heights 4. Pacific Coast, United States.**

1945

3I–171 551.591.1:551.508.92

†Crouch, C. L., **The relation between illumination and vision.** *Illuminating Engineering,* New York, 40(9):747–784, Nov. **1945.** 35 figs., 3 tables, 73 refs., equations. **DLC**—Visual acuity, contrast, time (speed of vision) and brightness and their interrelations are investigated from the illuminating engineers point of view. The Luckiesh-Moss visibility meter is described. *Subject Headings:* **1. Physics of visibility 2. Physiological factors in visibility 3. Visibility meters.**

3I–172 551.591

Fesenkov, V. G., **V. Sharonov. Vidimost' dalekikh predmetov.** [V. Sharonov. Visibility of distant objects.] *Astronomicheskii Zhurnal,* 22(1):58–59, **1945. DLC**—A complimentary review of Sharonov's book (*see* 3I–204 below for a later revision) which outlines the principal problems and methods of principal problems and measurement of visibility. *Subject Headings:* **1. Visibility theory 2. Reviews. I. Sharonov, Vsevolod Vasil'evich.**

3I–173 551.591:629.13

Florez, Luis de, **The relation between illumination and depth perception and its significance for aircraft pilots.** *Aeronautical Engineering Review, N. Y.,* 4(7):31–32, July **1945.** 2 figs., refs. **DLC**—Special investigation for the purpose of insuring the safety of the pilot who makes landings under twilight and night conditions. The observations were carried out under different conditions of illumination; sunlight, in clear and cloudy weather, rain, twilight and at night. A figure illustrates

a quick decrease of brightness near sunset time. *Subject Headings:* **1. Brightness contrast 2. Visibility 3. Depth perception 4. Aeronautical meteorology.**

3I–174 551.591

Larragoti, Alonso Luis, **Nociones sobre visibilidad.** [Ideas concerning visibility.] *Cuba. Observatorio Nacional, Havana, Boletín*, 4th Ser., 1(2):147–160, May/Aug. **1945.** 2 figs., tables. **DWB**—Physical factors of visibility, conditions needed for accurate determination of visibility range (size, color, distance of visibility markers) and comparison of measurements made during the day and at night. *Subject Heading:* **1. Visibility.**

3I–175 551.591.1

Leningrad. Universitet. Astronimicheskaia Observatoriia. Fotometricheskaia Laboratoriia, **Tablitsy dlia rascheta prirodnoĭ osveshchennosti i vidimosti.** [Tables for calculation of natural brightness and visibility.] Moscow, Izdatel'stvo Akademii Nauk SSSR, **1945.** 197 p. 49 tables, 39 equations. **DLC**—One of the complete works issued in past years under the supervision of V. V. Sharonov. Chap. 2–4 contain calculated data of brightness during daylight, twilight and moonlight. Chap. 5 and 6 deal particularly with the problem of visibility (physical and physiological factors important for visibility determination; dependence of visibility on extinction coefficient, angular size of the object, weather conditions; night visibility). *Subject Headings:* **1. Visibility 2. Night visibility 3. Visibility calculation. I. Sharonov, V. V.**

3I–176 551.508.92

Sharonov, Vsevolod Vasil'evich, **Uspekhi sovetskoĭ vizibilimetrii.** [Progress of visibility measurement in the U.S.S.R.] *Priroda*, Moscow, 34(6):15–21, June **1945. DLC**—A review of work done in the U.S.S.R. in construction of apparatus for visibility measurement. *Subject Heading:* **1. Visibility meters.**

3I–177 551.591

Slauer, Richard G., **The confusion in brightness thinking.** *Illuminating Engineering*, New York, 40(2):89–101, Feb. **1945.** 7 figs. Discussion p. 101–105. **DLC**—A critical analysis of existing view points and literature on the subject of brightness. The author discusses brightness concepts, the relation between brightness and visual acuity, and visual efficiency. *Subject Headings:* **1. Brightness contrast 2. Physics of visibility 3. Physiological factors in visibility.**

3I–178 551.510.53:551.591

Waldram, J. M., **Measurement of the photometric properties of the upper atmosphere.** *Royal Meteorological Society, Quarterly Journal*, 71(309/310):319–336, July–Oct. **1945.** 10 figs., 5 tables, append. **DWB, DLC**—Discussion of the results of a number of experiments made to measure the optical properties of the atmosphere (up to 30,000 ft in clean air, and to 3000 ft in industrial air). Nephelometer measurements and observations of the brightness of a searchlight beam exposed vertically were made in various seasons and on ship and shore. Polar Scatter Index, scattering coefficients and air-ground transmission variation with altitude shown on a large number of graphs, for both clean air and smoky air. At one time haze was observed up to 30,000 ft. Results of soundings of wind, temperature and humidity given for several of the series, and synoptic weather conditions for all of the series. (Same as *MAB* No. 4–42, April 1950.) *Subject Headings:* **1. Upper troposphere 2. Visibility 3. Scattering of light 4. Turbidity 5. England.**—*M.R.*

3I–179 551.501.1:551.591

Waldram, J. M., **Measurement of the photometric properties of the upper atmosphere.** *Illuminating Engineering Society of London, Transactions*, 10:125–130, 147–187, **1945.** figs., tables. **DBS**—Report on special investigations of visibility conditions using aircraft and special telephotometric instruments. The observations were carried out at different heights under various weather conditions and in clean and dusty air. *Subject Headings:* **1. Vertical visibility 2. Slant visibility 3. Visibility measurement techniques.**

3I–180 551.591.36(494)

*†Zenone, E., **Über Sicht- und Bewölkungesverhältnisse auf dem Flugplats Locarno-Mogadino.** [Visibility and cloud conditions at the airport of Locarno-Magadino.] *Switzerland. Meteorologische Zentralanstalt, Annalen*, **1945.** p. 1–3. 6 figs., 15 tables, 20 refs. Abstracted from reprint. **DWB**—A detailed statistical study of local visibility and cloud frequencies during the different months and times of day for 1940–1945. Comparison of visibility data with precipitation, fog, wind, humidity and cloudiness data reveals the main causes of poor visibility and explains the diurnal and seasonal variations. A comparison is made between conditions at other airports (Birsfelden, Cointrin and Dubendorf) and those at Locarno airport, which is located in the Magadino Valley in the southern

Alps. (Same as *MAB* 10–183, Oct. 1950.) *Subject Headings:* **1. Visibility 2. Aeronautical climatology 3. Locarno, Switzerland.**—*M.R.*

1946

3I–181 551.591.7:551.576.11:551.508.765(431/5)

aufm Kampe, H. J., **Visibility and water content in clouds.** *Mount Washington Observatory, Monthly Research Bulletin*, 2(9), Sept. **1946.** 18+p. refs. Original appeared in *Zentrale für wissenschaftliches Berichtswesen über Luftfahrforschung (ZWB), Berlin, Untersuchungen und Mitteilungen*, No. 3541. **DWB**—Observations made since 1943 at the German Research Institute for Soaring Flight, with airplanes containing searchlights and a base line of 16 m, etc. (equipment illustrated), are described and the theory briefly outlined. Using Koschmieder's formula for dependence of visibility on attenuation and observations of Diem and above-mentioned airplane observations, visibilities in different cloud types are calculated and shown graphically or represented by means of original records made in clouds. In Cu. clouds, average visibilities were mostly between 15 and 60 m, in StCu from 30 to 130 m, in St and high fog from 50 to 250 m, in Ac and As from 100 to 300 m. Actual visibilities vary even more. (In dense Cb clouds down to 2–5 m.) Besides the inhomogeneity of clouds, the results showed an increase in density from the base to the top of most clouds. In some cirrus, visibilities of 2000–3000 m were measured, in others 350–450 m. Average drop size spectra were calculated for various cloud types, and the values inserted in Trabert's formula for calculating liquid water content of the clouds. Values of liquid water content vs. visibility are shown graphically for various cloud types. For stratus type clouds the range is from 0.1 to 0.6 g/m^3, whereas for Cu 0.3 to 3.0 and Sc 0.1 to 1.5 g/m^3. Possibility of using infrared beams and of a direct method of measuring water content of clouds are presented. *Subject Headings:* **1. Visibility in clouds 2. Water content of clouds 3. Berlin-Aldershof, Germany. I. German Research Institute for Soaring Flight "Ernst Udet," Ainring, Germany, Institute of Physics of the Atmosphere.**—*M.R.*

3I–182 551.510.42:551.591(42)

Bonacina, L. C. W., **London visibility.** *Weather*, 1:83, July **1946.** **DWB**—Report of personal observations of visibility across London. Seasonal contrasts considered. (*Same* as *MAB* A–151, Jan. 1950.) *Subject Headings:* **1. Atmospheric pollution 2. Visibility 3. London, England.**

3I–183 551.591.1

Duntley, Seibert Q., **The visibility of objects seen through the atmosphere.** *Optical Society of America, Journal*, 36(6):359, June **1946.** **DLC**—Author analyzes the conditions of visibility depending upon the apparent contrast between the object and its background, the angular size of the object, its shape and the perceptual capacity of the observer at the level of brightness to which his eye is adapted. *Subject Headings:* **1. Visibility 2. Physical conditions 3. Physiological factors in visibility.**

3I–184 551.501.1:551.591

Fesenkov, V. G., **K voprosu o gorizontal'noĭ vidimosti.** [Contribution to the problem of horizontal visibility.] *Astonomicheskiĭ Zhurnal*, 23(2):111–122, **1946.** 3 tables. **DLC**—A theoretical investigation in which the author describes the methods used to measure visibility in the air layer near the ground. These methods are based on observation of brightness of a single screen and sky near horizon or of two identical screens, but at different distances from the observer. *Subject Headings:* **1. Horizontal visibility 2. Visibility measurement techniques.**

3I–185 551.591.1

Guardiola, J. M. J., **El problem de la visibilidad.** [The problem of visibility.] *Spain. Servicio Meteorológico Nacional, Publicaciones, Ser. B*, No. 5, **1946.** 42 p.—Unchecked. *Subject Heading:* **1. Visibility.**

3I–186 551.593.9:534:551.591.1:551.596.1

Schmauss, A., **Sichtbare Druckwellen.** [Visible pressure waves.] *Zeitschrift für Meteorologie*, 1(1):2–14, **1946.** **DWB**—Pressure and sound waves visible in the sky as bright and dark rings and stripes, were observed in Germany during the First World War, and again in 1942–3–4. The waves originated in artillery, flak, incendiary bombs and other explosions. A number of accounts of actual cases of this kind observed by meteorologists, together with the accompanying meteorological conditions, are cited for each type of disturbance which would produce pressure waves, including accounts of pressure waves from planes in flight. The thermodynamic theory, the optical theory, the method of formation of the clouds which accompany the waves and the oscillations of ice crystals, etc. in the field of gravity are considered. The presence of clouds is not necessary, but increases the possibility of viewing the phenomenon. (Same as *MAB* 1–159, Jan. 1950.) *Subject Headings:* **1. Optical phenomena 2. Acoustical phenomena 3. Visibility.**

3I–187 551.591.1:551.509.59(77)

U. S. Weather Bureau, **Forecasting Boston visibility, a progress report.** Boston, Mass., July **1946.** 10 p. 9 figs., tables, 17 equations. **DWB**—The author studied visibility conditions at Boston (annual variations, periods of low visibility and their duration) as a basis for forecasting. The variations of vision range with relation to other factors (wind, brightness, synoptic situation, etc.) are presented in tables and equations. *Subject Headings:* **1. Visibility conditions 2. Visibility forecasting 3. Boston, Mass. I. Goldman, Louis.**

1947

3I–188 551.591 551.508.92

Bibby, J. B., **Gold visibility meter Mk. 2.** *Meteorological Magazine*, London, 76(900):130–133, June **1947.** plate, 2 equations. **DWB**—The author describes a visibility meter constructed by E. Gold. Method of using the meter and relation between meter reading and equivalent daylight visibility are discussed. *Subject Headings:* **1. Gold's visibility meter 2. Night visibility.**

3I–189 551.510.42:551.591(42)

Brooks, C. E. P., **Atmospheric pollution in Great Britain in relation to the burning of coal.** *National Smoke Abatement Society, London, Proceedings* [of the] *Edinburgh Conference*, **1947,** p. 98–106. 7 figs., table. **DWB**—Incidence of sootfall, poor visibility, etc., in the United Kingdom as determined from deposit gages throughout the country. Charts show that industrial centers have poor visibility on 200 or more days a year, compared to 50 days a year in best localities, and that places of low visibility correspond to places of greatest sootfall. (Same as *MAB* A–174, Jan. 1950.) *Subject Headings:* **1. Atmospheric pollution 2. Visibility 3. Great Britain.**—*H.P.K.*

3I–190 551.510.42:551.591:551.593.7(43)

Dahlkamp, V. and Kantus, H., **Untersuchungen über den Reinheitsgrad der Atmosphäre mit Hilfe der neutralen Punkte der atmosphärischen Polarisation.** [Research on the degree of purity of the atmosphere with the help of the neutral points in atmospheric polarization.] *Zeitschrift für Meteorologie*, 1(8/9,10):253–263, 303–310, **1947.** 21 tables, 30 refs. **DLC, DWB**—A thorough summarization and discussion of the effect of atmospheric turbidity on the position of the Arago and the Babinet Neutral Points with various solar altitudes. Effect of temperature, humidity, dust of different composition, etc. on visibility. Research at Potsdam and Babelsberg compared with earlier work done at Arnsberg and Hamburg. (Same as *MAB* A–175, Jan. 1950.) *Subject Headings:* **1. Atmospheric pollution 2. Neutral point 3. Visibility 4. Polarization of light 5. Germany.**—*H.P.K.*

3I–191 551.591.6

*Foitzik, Leonhard (*Lindenberg*), **Theorie der Schrägsicht.** [Theory of slant visibility.] *Zeitschrift für Meteorologie*, 1(6):161–175, **1947.** 10 figs., 7 tables, refs., equations. **DWB**—An exhaustive study on dependence of visibility determination on physical (transparency of the air, reflective properties of object, brightness background) and physiological (state of observer, contrast threshold of the human eye, form of object, etc.) conditions. Numerous graphs, nomograms, equations and data of special observations illustrate this study. *Subject Headings:* **1. Slant visibility 2. Physical conditions 3. Psychological factors in visibility.**

3I–192 551.591.1:551.501

Fry, Glenn A., **The relation of the configuration of brightness contrast border to its visibility.** *Optical Society of America, Journal*, 37(3):166–175, March **1947.** 15 figs., 7 tables. **DLC**—A special investigation on the methods of visibility measurement as related to physiological effects. *Subject Headings:* **1. Visibility 2. Contrast threshold.**

3I–193 551.591.1

Fry, G. A., Bridgman, C. S. and Ellebrock, V. J., **The effect of atmospheric scattering upon the appearance of a dark object against a sky background.** *Optical Society of America, Journal*, 37(8): 635–641, Aug. **1947.** 8 figs., 5 refs., 15 equations. **DLC**—A special theoretical study of physical and physiological factors determining visibility conditions and their dependence on brightness of objects and background. *Subject Headings:* **1. Visibility 2. Physical conditions 3. Physiological factors in visibility.**

3I–194 551.591.31/32(42)

*Great Britain. Meteorological Office, **Monthly frequency tables, being summaries of observations of horizontal visibility, height of base of low cloud and speed and direction of surface and upper winds in the form approved by the International Commission for Air Navigation.** Jan. 1927–

Jan. 1947. London, 1927–[1947?]. tables. **DWB**—Each monthly table contains data on frequency of horizontal visibility at 0000h, 0600h, 1200h and 1800h G.M.T. and number of days with fog (visibility below 1000 m) for numerous points in England. *Subject Headings:* **1. Visibility data 2. Horizontal visibility variations 3. England.**

3I–195 551.591:551.510.42

Hoover, Robert A., **A study of visibility in smoke and haze at Washington National Airport.** U. S. Weather Bureau [1947?]. 4+leaves, map, 3 tables. Mimeographed. **DWB**—The main source of smoke pollution, which obscures visibility at the Washington National Airport, is the railroad yards near Alexandria, Va. Data for 4 winters are summarized and studied with regard to whether or not there was a radiation inversion, as evidenced by RAOBS made at the Airport. No relation was found, but there was a marked relation with wind direction, especially at night. Daytime restriction to visibility did correlate with stability. A chart of surrounding topography and smoke sources is included. (Same as *MAB* 2.8–162, Aug. 1951.) *Subject Headings:* **1. Visibility 2. Atmospheric pollution 3. Washington, D. C.**—*M.R.*

3I–196 551.591.

König, Hans, **Der Begriff der Helligkeit.** [The concept of brightness.] Neuchâtel, Édition du Griffon, **1947.** 191 p. 17 figs., 8 tables, 49 refs., equations. **DLC**—A comprehensive study of brightness—scientific analysis of its concepts, modifications and forms. The book is divided into 39 chapters dealing with different approaches to the problem and various interpretations of associated phenomena. Basic facts of colorimetry and methods of photometry are included. This work is important to the visibility problem because of the exhaustive characteristics of brightness and conditions of contrast sensibility of the human eye which are given here in great detail. *Subject Headings:* **1. Physics of visibility 2. Physiological factors in visibility.**

3I–197 551.591.36:62

*Lamar, Edward S., Hecht, Selig and Hendley, Charles D., **Size, shape and contrast in detection of targets by daylight vision.** *Optical Society of America, Journal*, 37(7):531–545, July **1947.** 1 figs., 3 tables, 7 refs. **DLC**—Physical basis of the methods of visibility observation is discussed. Special attention is paid to visibility by brightness between 17.5 and 2950 ft-L. *Subject Headings:* **1. Brightness contrast 2. Visibility targets.**

3I–198 551.591:551.508.92:551.575.1(794

*Landing Aids Experiment Station, Arcata, Calif., **Meteorology. Final report, 1947 Test season.** Letter of approval, Sept. 21, **1948.** 45 p. 21+figs. **DWB**—An intensive study of fog occurrence at Arcata. The investigators classify fog: advection fog, radiation fog and frontal fogs; determine the factors influencing fog formation (California current, winds, inversion) and describe meteorological observations and research which were made by flight tests during poor visibility. The descriptions of visibility markers, threshold lights and transmissometers used for visibility measurement are given in detail. The constant for the equation presented by Douglas and Young for the relationship of atmospheric transmissivity to visibility was derived from 270 observations. *Subject Headings:* **1. Visibility data 2. Visibility in fog 3. Night visibility 4. Visibility meters 5. Fog formation 6. Arcata, Calif.**

3I–199 551.591.6:551.508.92:551.575.1(794

*†Landing Aids Experiment Station, Arcata, Calif., **Meteorology. Final report No. 9, Jan. 31, 1947.** 71 p. 23 figs., 19 refs. **DWB**—A study related to the problem of safety in landing of aircraft during periods of low visibility. Fog as well as other chief factors in limited visibility were under intensive investigation. The first section reviews known information and speculations on the nature of fog, transmission of light through fog. In addition, different methods of dispersing fog artificially are discussed. Method of thermal dispersion of fog and problem of instrumentation for ceiling, visibility, wind and temperature measurements are considered in detail. On p. 58–57 entitled "Visibility," a special description of visibility meters (National Bureau of Standard transmissometers) and visual observations of horizontal and slant visibility are given. *Subject Headings:* **1. Visibility in fog 2. Fog dissipation 3. Slant visibility 4. Visibility meters 5. Arcata, Calif.**

3I–200 551.591:551.510.4

Langstroth, G. O., et al., **A laboratory study of visibility through clouds.** *Canadian Journal of Research, Sec. A*, 25:49–57, Jan. 1947. 6 figs., 2 tables, 10 refs., equations. **DLC**—Detailed technical laboratory experiments using ammonium chloride smoke at various brightness levels. Results indicate the equation given is adequate. (Same as *MAB* A 188, Jan. 1950.) *Subject Headings:* **1. Smoke screens 2. Visibility in clouds.**

3I–201 551.591:551.510.42

Langstroth, G. O., **The recognition of objects nearly obscured by a cloud.** *Canadian Journal of Research, Sec. A*, 25:58–67, Jan. 1947. 8 figs., 2 tables, 2 equations. DLC—A detailed study of the conditions under which the apparent loss of definition occurs was carried on simultaneously with the study of total obscuration. The optical density of smoke required to produce loss of definition was found to be related to cloud brightness. (Same as *MAB* A–189, Jan. 1950.) *Subject Headings:* **1. Smoke screens 2. Visibility in clouds.**—*H.P.K.*

3I–202 551.591.1

Middleton, W. E. Knowles, **Note on the visual range of white and grey objects.** *Royal Meteorological Society, Quarterly Journal*, 73:317–318, 455–459, July–Oct. **1947.** 2 figs., 11 refs., 13 equations. DLC—Calculation of visibility depending on color of the object and on distance from zenith. Verification of the results by observations made in May 1947. *Subject Heading:* **1. Physics of visibility.**

3I–203 551.591:551.509.59(747)

§New York University. Dept. of Meteorology, **An objective method of forecasting visibility.** New York, April 1947. 43 p. 12 figs. 5 tables. DWB—An objective method of forecasting visibility at La Guardia Field, N. Y., in the winter season, is developed from data for the winter of 1943–1944 and tested in the winter of 1944–1945. The method is based on 24 h trajectories, which are forecast by a carefully prescribed, routine procedure. The visibility at the origin of a trajectory, the location of the origin, and the final wind velocity implied by the last segment of the trajectory are combined by means of forecast charts and formula, to produce a 24 h forecast of visibility. *Subject Heading:* **1. Visibility conditions 2. Visibility forecasting 3. Objective forecasting 4. La Guardia Field, N. Y. I. Miller, James E. II. Mantis, Homer T.**—*From author's abstract.*

3I–204 551.591:551.508.92

Sharonov, Vsevolod Vasil'evich, **Izmerenie i raschet vidimosti dalekikh predmetov.** [Measurement and calculation of visibility of distant objects.] Leningrad, **1947.** 283 p. figs., tables, refs., equations. DLC—One of latest comprehensive studies on visibility made by an authority in this field. The author analyzes physical and physiological factors important to measurement of visibility, describes principal methods and apparatus for visibility determination and makes some corrections to the theory of visibility. *Subject Headings:* **1. Physics of visibility 2. Physiological factors in visibility 3. Visibility measurement techniques.**

3I–205 551.591:551.501

Sharonov, Vsevolod Vasil'evich, **Skhemy nabliudenii diafonoskopom pri opredelenii prozrachnosti atmosfery i dal'nosti vidimosti.** ["Diafonoskop" observations for definitions of air transparency and visibility.] *Leningrad. Univer. tet. Nauchnyi Biulleten'*, No. 18:7–8, **1947.** DLC—Theoretical analysis of 4 methods of visibility determination and a short review of the possible errors in these observations. *Subject Heading:* **1. Visibility measurement techniques.**

3I–206 551.510.42:551.575:551.508.92

Veitser, V. I., **O prilozhimosti nefelometricheskogo metoda k opredeleniiu dal'nosti vidimosti i koefitsienta oslableniia sveta v gustykh dymakh i tumanakh.** [On the application of the nephelometric method to determine visibility and extinction coefficient in thick smoke and fog.] *Zhurnal Tekhnicheskoi Fiziki*, 17(4):469–474, **1947.** 3 figs., 4 tables, 7 refs. DLC—Nephelometric method of determining transparency of the atmosphere is not recommended for investigating dense mists, dusty atmosphere and artificial smoke clouds. (Same as *MAB*, A–201, Jan. 1950. *Subject Headings:* **1. Nephelometers 2. Atmospheric pollution 3. Air sampling and analysis 4. Visibility.**—*H.P.K.*

1948

3I–207 551.591:632.187

Byram, George Marsden and Jemison, G. M., **Some principles of visibility and their application to forest fire detection.** *U. S. Dept. of Agriculture, Technical Bulletin* No. 954, **1948.** 61 p. illus. DA—Effect of haze on visibility. Haze and sunlight. Practical measurements of visibility. Visibility meters listed. Methods for estimating visibility without instruments. Application to fire detection problems. (Same as *MAB* A–205, Jan. 1950.) *Subject Headings:* **1. Atmospheric pollution 2. Visibility 3. Forest fire detection.**—*H.P.K.*

3I–208 551.591.3:551.591.6:551.508.92:629.13

Calvert, E. S., **Visual aids for low visibility conditions; a discussion of the fundamental requirements, with a brief account of some results obtained on the R.A.E. simulator.** *Royal Aeronautical*

Society, Journal, 52(451):439–476, July **1948.** diagr., graphs, refs. **DLC**—Theoretical work done at the Royal Aircraft Establishment, Farnborough, England in 1946–1947 to determine what visual aids should be installed at civil airports. Among many diagrams and charts is one which gives intensity of lights or markers required for a visibility range of 1 mile under various atmospheric conditions (day and night). Meteorological visibility is expressed in miles and in international scale. Another chart shows comparative ranges of runways in daylight (lighted and unlighted) with visibility from 50 to 10,000 yards. Perspective, slant visibility criteria, range at which various patterns or markings cease to be visible under various conditions, etc. are treated. (Same as *MAB* 3.5–277, May 1952.) *Subject Headings:* **1. Visibility 2. Slant visibility 3. Aerial navigation.**—*M.R.*

3I–209 551.508.92

Cherniavskiĭ, E. A., **Dal'nost' vidimosti i ee geofizicheskie kharakteristiki.** [Range of visibility and its geophysical characteristics.] *Akademia Nauk, SSSR, Izvestiia, Ser. Geogr. i. Geofiz.*, 12(5):405–420, **1948.** 14 figs., 7 refs. **DWB, DLC**—A method for determining visibility, either at night or in the daytime, by means of measurements of the intensity of dissipation of an electric charge from an apparatus exposed in the free air at one point. This method is compared with results obtained from a turbidity meter and it is stated that good agreement exists. Work done under varying cyclonic and climatic conditions. Apparatus illustrated and many curves show correlation between different methods and under differing conditions. Tested at Tashkent and Irkutsk observatories. (Same as *MAB* No. 2–46, Feb. 1950.) *Subject Headings:* **1. Visibility instruments 2. Visibility.**—*M.R.*

3I–210 551.593.54:551.591.1/6

Duntley, S. Q., **The reduction of apparent contrast by the atmosphere.** *Optical Society of America, Journal*, 38(2):179–191, Feb. **1948.** 8 figs., 2 tables, 18 refs., 32 equations. **DWB**—A comprehensive, theoretical study. Special values were derived for the cases of visibility upward, visibility downward and horizontal visibility. On the basis of these conclusions, experimental observations under different sky and ground conditions were also carried out. *Subject Headings:* **1. Horizontal visibility 2. Slant visibility 3. Vertical visibility.**

3I–211 551.591.1

Lamar, Edward S., Hecht, Selig, Hendley, Charles D. and Shlaer, Simon, **Size, shape and contrast in detection of targets by daylight vision. II. Frequency of seeing and the quantum theory of cone vision.** *Optical Society of America, Journal*, 38(9):741–755, Sept. **1948.** 18 figs., 3 tables, 7 refs. **DLC**—Frequency of seeing; usual flux of the retinal image; probability of seeing and perimeter; meaning of a single exposure, probability theory and Poisson's Law, foveal cone vision and probability; number of cones and frequency of seeing; threshold contrast and the "Noise Level"; brightness and the number of quanta. (Same as *MAB* 1–154, Jan. 1950.) *Subject Headings:* **1. Visibility 2. Physiological factors in visibility.**—*H.P.K.*

3I–212 551.591:551.575.1(794)

*Landing Aids Experiment Station, Arcata, Calif., **Fog dispersal operation.** Contract C 13ca-136, Progress Report, 1948 Test season. [1948?]. 17 p. 4 figs., 2 tables, 4 refs. **DWB**—A review of modifications and additions to field installations made during 1948 for fog dispersal. Technique of operations and weather conditions in which they were conducted are considered. Results are discussed. Good data on visibility, ceiling and wind during July–November 1948 are given in tables. *Subject Headings:* **1. Visibility in fog 2. Fog dissipation 3. Arcata, Calif. I. Contract C 13ca-136.**

3I–213 551.588.2:551.591:551.576.4

Nurminen, Aili, **Stauwirkung der Salpausselkä-Hügelkette.** [Orographic upslope effect of the Salpausselkä range.] *Geophysica, Helsinki*, 3:180–192, **1948.** 2 figs., 12 tables, 7 refs. English summary p. 191–192. **MH-BH**—A study of the influence of the Salpausselkä range on visibility and ceiling on its southeast slope. The author discusses the relationship between upslope and wind direction, the effect of upslope weather upon visibility and the relationship between upslope and ceiling. Data are presented on the vertical distribution of temperature in the southeast currents wherein the upslope effects are most marked. (Same as *MAB* 10–179, Nov. 1950.) *Subject Headings:* **1. Topographic effects 2. Visibility 3. Ceiling heights 4. Air mass climatology 5. Finland.**—*I.L.D.*

3I–214 551.508.92

Sharonov, Vsevolod Vasil'evich, **Resul'taty ispytaniia diafonoskopa v polevykh usloviiakh.** [Results of "diafonoskop" testing in field conditions.] *Leningrad. Universitet. Nauchnyi Biulleten'*, No. 2:3–5, **1948.** **DLC**—A report on special investigations made during 1942–1944

for the determination of the accuracy of this instrument and of the sources of possible errors. *Subject Headings:* **1. Visibility meters 2. Sharanov's visibility meter.**

3I–215 551.593.54

Siedentopf, Heinrich, **Optische Erscheinungen an Dunstgrenzen.** [Optical phenomena at haze boundaries.] *Meteorologische Rundschau*, 1(15-16):456–459, Sept.–Oct. **1948.** 5 figs., 7 refs., 20 equations. **DWB**—Theoretical development, discussion and graphical presentation of data for light density above and below haze-boundaries. Difference between curves compiled from Hulbert's formula (*see* 3I–271 below) and those compiled from empirical (searchlight) data shown for 20°, 40° and 60° solar elevation, and 0° to 180° solar azimuth, with greatest discrepancy at very high and low azimuth. (Same as *MAB* 2–178, Feb. 1950.) *Subject Headings:* **1. Optical phenomena 2. Haze 3. Visibility.**—*H.P.K.*

3I–216 551.506.1:656.7

*U. S. Civil Aeronautics Administration, **Airport weather analysis; report on hourly observations at 17 major sites.** Washington, D. C., Jan. **1948.** 73 p. tables, graphs. **DLC**—An analytical summary of hourly observations for one year at 17 U. S. Weather Bureau airport stations in the U. S. A. The percentage frequency of total days, of parts of whole days and of total hours with ceilings and/or visibility in certain categories, is given. *Subject Headings:* **1. Flying weather 2. Visibility frequencies 3. United States. I. U. S. Weather Bureau.**—*M.R.*

1949

3I–217 551.591.1:551.501.42

Cena, Guiseppe, **Sulla misure della visibilitá con speciale riguardo a quella notturna.** [On measurement of visibility with special regard to night observations.] *Rivista di Meteorologia Aeronautica*, 9(2):48–53, April/June **1949.** 2 figs., 5 refs., 5 equations. **MH-BH, DWB**—Discussion of theory of visibility with nomograms for calculating relationships under varying nocturnal conditions (complete darkness, moonlight or twilight) and tables for determining visibility at night by observing the distance a 50 or 200 candle-power electric lamp could be seen under varying illumination conditions. (Same as *MAB* No. 8–136, Aug. 1950.) *Subject Headings:* **1. Visibility measurement 2. Computation tables 3. Nomograms.**—*M.R.*

3I–218 551.508.92

Coleman, H. S., Morris, F. J., Rosenberger, H. E. and Walder, M. J., **A photo-electric method of measuring the atmosphere attenuation of brightness contrast along a horizontal path for the visible path of the spectrum.** *Optical Society of America, Journal*, 39(7):515, July **1949.** **DLC**—A brief review of an original method, developed by the authors. *Subject Headings:* **1. Visibility observation techniques 2. Brightness contrast.**

3I–219 551.591.2(42)

*Great Britain. Meteorological Office, **Percentage frequencies of various visibility ranges at certain places in the British Isles between the years 1927 and 1936. 1949.** 52 p. tables. M.O. 521. **DWB, DLC**—Contains monthly, seasonal and annual percentage frequencies of the visibility range adopted by the International Commission for Air Navigation. The observational data for 7 a.m., 1 p.m. and 6 p.m. are given for 49 stations. *Subject Headings:* **1. Visibility frequencies 2. British Isles.**

3I–220 551.591.1

Higgins, G. C. and Stultz, K., **Visual acuity as measured with various orientations of a parallelline test object.** *Optical Society of America, Journal*, 38(9):756–758, Sept. **1949.** fig., 2 tables. **DLC**—*Subject Heading:* **1. Visual acuity.**

3I–221 551.591.3:551.576(77)

*§Hilwort, J. T., **Brief study of St. Louis I. L. S. weather conditions.** Chicago, Eastern Air Lines, Inc., Meteorological Dept., Oct. **1949.** 12 p. 12 figs., 6 tables. **DWB**—The weather situations which accompany ceilings and visibility less than 500 ft and 1 mi were studied. The lowest values of visibility for each type is given in tables. *Subject Headings:* **1. Poor visibility 2. Ceiling heights 3. Weather conditions 4. St. Louis, Mo.**

3I–222 551.594.13:551.591

Kilinski, Erich von, **Über den Einfluss meteorologischer Faktoren auf die atmosphärische Leitfähigkeit.** [On the influence of meteorological factors on atmospheric conductivity.] *Zeitschrift für Meteorologie*. 3(1/2):46–49, Jan./Feb. **1949.** 3 figs., table, 4 refs. German summary p. 46.

DWB—Electrical conductivity increases with visibility up to 29 kc, then constant. It decreases with increasing relative humidity, especially near saturation; in both these relations ion adsorption plays an important part. Conductivity increases with temperature up to 20–30°C because of increased release of air from soil; a possible decrease above 30° may be due to vertical currents. (Same as *MAB* 3–142, March 1950.) *Subject Headings:* **1. Atmospheric conductivity 2. Visibility.**—*C.E.P.B.*

3I–223 551.591.31/32:551.508.92:551.575.1(794)

*†Landing Aids Experiment Station, Arcata, Calif., **Flight operation, Meteorology, Electronics, Airfield lighting, Fog dispersal.** Final reports. **1949.** 243 p. figs., tables, refs. **DWB**—A comprehensive study on the program of testing and evaluating visual landing aids during low visibility. Parts entitled "Meteorology" and "Airfield lighting" contain material on visibility and its determination. For visibility observations, special visibility targets were installed at various distances up to 3000 ft. Instrumental measurements of vision range were carried out by means of transmissometer of the Bureau of Standards. At the request of the U. S. Weather Bureau, the visibility meter constructed by Massachusetts Institute of Technology was tested. In conclusion, the author states that this meter, in its present form, cannot be used as a reliable aid in estimating visibility range. Numerous photographs and diagrams illustrate the installation used for observations of visibility. Monthly frequency of visibility range groups by day and night for 1949 and annual distribution of visibility are given in graphs. *Subject Headings:* **1. Visibility frequencies 2. Visibility in fog 3. Night visibility 4. Visibility meters 5. Arcata, Calif.**

3I–224 551.591.1

Levitin, I. B., **Vidimost' i maskirovka korablei.** [Visibility and camouflage of ships.] Moscow, Voen. Izdat., **1949.** 145 p. 59 figs., 13 tables, 12 refs. **DLC**—Special study with short history of ths use of camouflage in the Russian navy. Description of physical and physiological bases of visibility. The principles and methods of visual camouflage are presented in detail. The application of color filters for increase of visibility and the problem of visibility of invisible rays are discussed. *Subject Headings:* **1. Physical conditions 2. Physiological factors in visibility 3. Visibility of "invisible" radiation 4. Camouflage.**

3I–225 551.591.1 551.574.1:551.594(547)

Mukherjees, S. M., **On the diurnal variation of condensation nuclei and visibility at Colaba (Bombay), and related changes in the earth's electric field.** *Journal of Geophysical Research*, 54(2):173–176, June, **1949.** 5 figs., table. **DWB**—Hourly observations of condensation nuclei, electrical conductivity and visibility of the air were taken, analyzed and compared with the corresponding values of potential gradient and winds. The principal variation of the earth's electrical field found to be directly related to air contamination. Effects of monsoon discussed. (Same as *MAB* A–234, Jan. 1950.) *Subject Headings:* **1. Visibility 2. Atmospheric conductivity 3. Weather conditions 4. Bombay, India.**—*H.P.K.*

3I–226 551.591.6:551.501.1

*Stewart, H. S., Drummeter, L. F. and Pearson, C. A., **The measurement of slant visibility.** *U. S. Naval Research Laboratory, N.R.L. Report N-3484*, [**1949?**]. 4+8 p. 6 figs., 13 equations. **DWB**—A description of a new method of slant visibility measurement. Atmospheric transmission was determined by means of a 36-inch searchlight as source and two modified Luckiesh-Taylor photometers. Authors present equations showing mathematical relationships of this problem and results of the method for testing on the night of April 14, 1949 at the Chesapeake Bay Annex. *Subject Headings:* **1. Slant visibility measurement 2. Washington, D. C.**

3I–227 551.591:551.575(773)

Strickler, R. F., **A preliminary investigation of the forecasting of low ceiling and visibility at Chicago Municipal Airport.** Chicago, Eastern Air Lines, Inc., Meteorological Dept., Nov. **1949.** 21 p.+6 p., 8 figs., tables, 6 refs. **DWB**—An analysis of all weather situations in which the ceiling or visibility were less than 300 ft or $\frac{3}{4}$ mile, respectively, or the visibility less than $\frac{1}{2}$ mile if the ceiling was unlimited. The study is based on observational data for the years 1941–1946. *Subject Headings:* **1. Poor visibility 2. Fog 3. Ceiling heights 4. Chicago, Ill.**

3I–228 551.591

Tschirske, Hilmar, **Bedeutung entfernter Wolken für die Beurteilung der Sicht.** [The importance of distant clouds for estimating visibility.] *Meteorologische Rundschau*, 2(1–2):26–29, Jan.–Feb. **1949.** 3 figs., table, 3 refs., equations. **MH-BH**—Assuming the height of a cloud from its form, the author gives tables for determining its distance by the angle of elevation, taking account of the height of the observer and the curvature of the earth. (Same abstract as *MAB* 2–177, Feb. 1950.) *Subject Heading:* **1. Visibility.**—*C.E.P.B.*

3I–229 551.508.762

Weickmann, Helmut and Bullrich, Karl, **Ein Beitrag zur Bestimmung der Sichtweite bei Nacht.** [A contribution to measurement of visibility at night.] *Meteorologische Rundschau*, 2(9–10):289–290, Sept.–Oct. **1949.** 2 tables. **DWB**—Authors propose to direct cloud searchlight horizontally and measure intensity in lux at 500 or preferably 1000 m with a photometer. Conversion scales to visibility in km given. (Same as *MAB* 5–21, May 1950.) *Subject Headings:* **1. Ceiling projectors 2. Night visibility.**—*C.E.P.B.*

1950

3I–230 551.576:551.591

auf'm Kampe, H. J., **Visibility and liquid water content in clouds in the free atmosphere.** *Journal of Meteorology*, 7(1):54–57, Feb. **1950.** 6 figs., 15 refs., 6 equations. **DWB, DLC, MH-BH**—By measuring the scattering coefficients from an airplane in different kinds of clouds (cumulus congestus, cumulus, stratocumulus, stratus and altostratus) and using Koschmieder's formula which was checked by means of data obtained on Mount Washington, the visibility, drop size and liquid water content of these clouds were determined. Values ranged from 10 meters to several hundred meters for visibility, from 10μ to 4μ for drop size, and from 2.5 g/m^3 for water content in the above named clouds in the respective order given. Microphotographs of droplet samples were made and one reproduced. (Same as *MAB* 5–71, May 1950.) *Subject Headings:* **1. Physics of visibility 2. Drop size distribution 3. Water content of clouds.**—*M.R.*

3I–231 551.593.5

Barber, D. R., **The effect on observations of the sky/sea brightness ratio produced by the use of color filters and polaroid screens.** *Royal Meteorological Society, Quarterly Journal*, 76(327):95–98, Jan. **1950.** 3 tables, figs. **DWB**—Report on investigations made by means of the G.E.C. portable telephotometer of Luckiesh-Taylor type and with the aid of a Zeiss 7 cm F3.5 anastigmat lens. *Subject Headings:* **1. Brightness contrast 2. Color visibility.**

3I–232 551.591.1

Boldyrev, N. C., **Dal'nost' vidimosti real'nykh ob'ektov.** [Range of visibility of actual objects.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 19(81):14–24, **1950.** 6 tables, 4 refs., 10 +equations. **DLC**—The author analyzes the conditions of visibility of actual objects, as determined basically by the transparency of the atmosphere (meteorological visibility) and the condition of perceptibility of objects against their background, depending upon the contrast in their brightness and the distance from the observer. The article contains formulas for computation of both kinds of visibility and of their interrelation, and a nomogram of the range of daylight visibility, constructed by the author in 1946. (Same as *MAB* 2.8–163, Aug. 1951.) *Subject Heading:* **1. Visibility measurement.**—*C.K.*

3I–233 551.591:551.593.5

Coleman, Howard S. and Rosenberger, Harold E., **Spectral dependence of the attenuation of brightness contrast by the atmosphere.** *Journal of Meteorology*, 7(4):259–262, Aug. **1950.** 7 figs., table, 6 refs., 6 equations. **MH-BH**—The effect of wave length on the attenuation of brightness contrast by the atmosphere was studied by means of apparatus and procedure based upon a law derived by Koschmieder. The attenuation coefficient was expressed in terms of meteorological range and measurements were made by means of which the dependence of meteorological range upon wave length was found to be a linear rather than a fourth power function, and the linear relationship was valid for white and black objects over a wide range of atmospheric transparencies. It is concluded that molecular scattering is not the predominant factor in the atmospheric attenuation of brightness contrast. (Same as *MAB* 2.2–152, Feb. 1951.) *Subject Headings:* **1. Brightness contrast 2. Scattering of light 3. Color visibility.**—*I.L.D.*

3I–234 551.591.1

Foitzik, Leonhard (*Lindenberg*), **Zur meteorologischen Optik von Dunst und Nebel. Teil II.** [On the meteorological optics of haze and fog. Part II.] *Zeitschrift für Meteorologie*, 4(11):321–329, Nov. **1950.** 2 figs., 4 tables, 24 refs., 11 equations. **MH-BH**—Pt. I appeared in Zeit. für Met., Oct. 1950 (see *MAB* 2.10–185, Oct. 1951). In Pt. II the distribution of drop size is considered. In natural fogs the range of drop radius is very variable but all can be expressed by the normal curve $y = e^{-A(\log p/r)^2}$, where y = relative frequency, p = radius, r most frequent radius and A in North Sea fog varies from 15 to 50, mean 27. The inference is that all nuclei are not equally effective and this is confirmed by experiments with a cloud chamber with different degrees of dilatation. The Stratton-Houghton function for loss of light with drops of equal radius (Pt. I) is recalculated for this drop size distribution. (Same as *MAB* 3.3–238, March 1952.) *Subject Headings:* **1. Physics of visibility 2. Haze 3. Fog 4. Drop size distribution.**—*C.E.P.B.*

3I–235 551.591.1:551.593.54

Götz, F. W. Paul, **Optics of the turbid atmosphere.** *International Union of Geodesy and Geophysics, Association of Meteorology, Transactions, Oslo 1948*, 2:89–93, **1950.** 3 figs., 11 refs. Mimeographed. **DWB**—The literature on special atmospheric extinction is reviewed. It is shown that the optics of a turbid atmosphere can be derived theoretically from good extinction curves in which the extinction coefficient and the scattering function can be interpolated if the size, number and quality of the turbid particles are known. (Same as *MAB* 3.4–246, April 1952.) *Subject Headings:* **1. Turbidity 2. Physics of visibility.**—*I. L. D.*

3I–236 551.591:551.582(61/62)

*Great Britain. Meteorological Office, **Aviation meteorology.** *Great Britain. Meteorological Office, Meteorological Report*, No. 5, **1950.** 46 p. 9 figs., 2 tables, 12 refs. +21 p. of tables and append. M.O. 496 e. **DWB**—A study on synoptic meteorology and climate. Appendix contains tables for 10-station summary of visibility data and ceiling. *Subject Headings:* **1. Visibility data 2. Aeronautical meteorology 3. Egypt 4. Libya.**

3I–237 551.508.92

Great Britain. Meteorological Office, **Symposium on the measurement of visibility.** *Meteorological Magazine*, London, 79(934):112–118, April **1950.** 2 photos, 9 refs., 3 equations. **DWB**—KOSCHMIEDER's theory of daylight visibility is accepted, giving $V = 3.91/\sigma$, σ = extinction coefficient of atmosphere. Visibility meters are described as: measuring air-light; measuring σ directly by attenuation of artificial light; measuring scattering coefficient. Brewer-Beuttell meter is illustrated. Discussion, opened by G. J. W. Oddie, centered largely on Gold meter. (Same as *MAB* 6–18, June 1950.) *Subject Headings:* **1. Visibility meters 2. Symposia.**—*C.E.P.B.*

3I–238 551.591.2 551.591.3 551.582(43)

*Hauer, H., **Klima und Wetter der Zugspitze; 50 Jahre meteorologische Beobachtungen des Observatoriums Zugspitze.** [Climate and weather on the Zugspitze; 50 years meteorological observations of the Zugspitze Observatory.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 16, **1950.** 200 p. 67 figs., 16 photos, 165 tables, 128 refs. **MH-BH**—A presentation of weather data of every type, both in tabular and in analytical form. On p. 102–105 (3 figs., table), an article entitled **"Die Sichtverhältnisse auf der Zugspitze mit besonderer Berücksichtigung der Sichtweiten > 100 km,"** (Visibility conditions on the Zugspitze with especial attention to visibility > 100 km), contains a summary of percentage frequency of visibilities over 100 km for the period 1935–1939 in various directions from the station, annual variation of visibility at 7 a.m. and 2 p.m., and diagram of visibility markers. (Same as *MAB* 2.1–151, Jan. 1951.) *Subject Headings:* **1. Mountain meteorology 2. Visibility frequencies 3. Zugspitze, Bavarian Alps.**

3I–239 551.574.1

†Junge, Christian, **Das Wachstum der Kondensationskerne mit der relativen Feuchtigkeit.** [The growth of condensation nuclei with relative humidity.] *Annalen der Meteorologie*, 3(5/6):129–135, **1950.** 4 figs., 2 tables, 20 refs., equation. German and English summaries p. 129. **DWB, DLC, MH-BH**—A useful summary of the literature. Growth of nuclei and formation of haze begins with R.H. about 70% and increases rapidly above 90% (formulas quoted). In most aerosols, mixed nuclei predominate. The proportion of charged to uncharged nuclei also depends on humidity. Growth curves are modified by presence of impurities, illustrated by curves for HCl. Variations of visibility below 70% are attributed to varying solubility of nuclei. Dry fogs in industrial regions are attributed to oxidation of SO_2 (following AITKEN). (Same as *MAB* 11–123, Nov. 1950.) *Subject Headings:* **1. Condensation nuclei 2. Visibility variations.**—*C.E.P.B.*

3I–240 551.591(431/5)

*Meurers, Joseph, **Sichtuntersuchungen am Aeronautischen Observatorium Lindenberg.** [Visibility investigations at the Lindenberg Aeronautical Observatory.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 13, **1950.** 19 p. 10 figs., 2 tables, 6 equations. **MH-BH**—This is a comprehensive, but qualitative, review of studies on visibility carried out at Lindenberg in 1944. The experimental procedures and method of analysis of data are presented. The investigation was concerned with visibility and atmospheric turbidity during daylight, at night and during morning and evening twilight and with the interrelationship between visibility and atmospheric turbidity. The influence of meteorologic factors and of latitude are also discussed. The author presents curves by means of which daylight or night visibility during twilight can be predicted if atmospheric turbidity remains constant. (Same as *MAB* 10–182, Oct. 1950.) *Subject Headings:* **1. Visibility 2 Visibility forecasting 3. Lindenberg, Germany.**—*I. L. D.*

3I–241 551.591.1:535.3

Middleton, W. E. Knowles, **The attenuation of contrast by the atmosphere.** *Photogrammetric Engineering*, Wash., D. C., Dec. **1950.** p. 663 672. 7 figs., 26 refs., 11 equations. Abstracted from reprint. **DWB**—This is a review paper dealing with the reduction in contrast or attenuation of the differences in brightness between various objects caused by the atmosphere. The author presents the derivation of Bouguer's law which holds for the transmissivity of monochromatic light and the equation of DUNTLEY (see 3I 183) for determining attenuation of contrast. He also discusses the dependence of the extinction coefficient upon wave length, observations on the aerosol to determine the size of haze and fog droplet, and the effect of the atmosphere on the color of objects. (Same as *MAB* 3.5–276, May 1952.) *Subject Headings:* **1. Atmospheric attenuation 2. Visibility 3. Bouguer's law.**—*I. L. D.*

3I–242 551.591(54)

Mukherjee, S. M. and Karve, C. S., **Visibility at the Colaba Observatory, Bombay.** *Indian Journal of Meteorology and Geophysics*, 1(3):220–228, July **1950.** 5 figs., 3 tables, ref. **MH-BH, DWB**—Visibility measurements were made at the Colaba Observatory, Bombay, from an elevation of 50 ft by means of the Bennett and Wigand meters. The observations were made at specified hours between surise and sunset and at night. The authors discuss the relation between Wigand and Bennett meter disc numbers and the International Code Figures for Visibility on selected days and nights, and the relationship between wind direction and visibility. (Same as *MAB* 2.2–153, Feb. 1951.) *Subject Headings:* **1. Visibility measurement 2. Bombay, India.**—*I. L. D.*

3I–243 551.591:551.593.54:551.521.31(98)

*Olson, H. and Schüepp, Walter, **Die Atmosphärische Trübung in Spitzbergen.** [Atmospheric turbidity in Spitsbergen.] *Geografiska Annaler*, 32(3–4):210–219, **1950.** 2 figs., 5 tables, refs. **MH-BH**—Special actinometric and psychometric observations were made on Isenchsen Plateau in West Spitsbergen during the summer of 1934. The atmospheric turbidity for different wave lengths and the variations of the radiation intensity were computed. (See *MAB* 3.6–185, June 1952.) *Subject Headings:* **1. Turbidity 2. Insolation 3. Spitsbergen.**—*M. R.*

3I–244 551.593:551.591.361(87)

Sifontes, Ernesto, **Nubes y petroleo; por tierras y cielos de Anzoâtegui.** [Clouds and oil; by land and air from Anzoategui.] Caracas, Imprenta Nacional, **1950,** 28 p.—A general description of the structure of the atmosphere, cloud forms, and some aspects of atmospheric optics, followed by an account of unusual visibility of an oil conflagration which occurred on March 25, 1946 at Santa Rosa, Venezuela. The fire was plainly visible at El Tigre 30 mi away, and could be seen even at a distance of 100 km. Considerable quantitative data are given for atmospheric conditions and the conflagration. (Same as *MAB* 3.5–278, May 1952.) *Subject Headings:* **1. Exceptional visibility 2. Venezuela.**—*M. R.*

3I–245 551.591

Wengerd, Sherman A., **Visibility of signal cloth under tropical conditions.** *American Geophysical Union, Transactions*, 31, Pt. 1, (2):165–168, April **1950.** 3 figs., table. **DWB, MH-BH**—Different colors of fresh and faded cloth with and without fluorescent dye were tested under various tropical weather conditions. Difference between observers often as great as between types of cloth. Yellows show up best on dark day and orange on a sunny day. Fluorescence is more important in extending visibility on cloudy than on sunny days. Results presented in histograms. (Same as *MAB* 7–123, July 1950.) *Subject Headings:* **1. Visibility 2. Color visibility.**—*M. R.*

1951

3I–246 551.508.92

Boldyrev, N. G., **Tochnost' izmeriteleĭ vidimosti.** [Accuracy of visibility meters.] *Akademiia Nauk SSSR, Izvestiia, Otdelenie Technicheskikh Nauk*, No. 12:1786–1791, Dec. **1951.** 10 refs., 5 equations. **DLC**—An analysis of conditions determining good results of visibility measurement. The contrast sensitivity of the observer's eyes is the most important factor for accuracy of measurement. The author gives a mathematical analysis of probable errors and concludes that to get correct visibility measurements thorough training of observers is needed. *Subject Headings:* **1. Visibility meters 2. Instrument accuracy.**

3I–247 551.508.92

†Brewer, A. W. and Scrase, F. J., **Meteorological measurements,** *Royal Meteorological Society, Quarterly Journal*, 77(331):3–32, Jan. **1951.** 2 figs., 62 refs. **DWB**—The authors state: "it has not been practicable to cover anything like the whole field of meteorological measurements and our

attention has in the main been focused on those methods and developments which have not, so far, found their way into textbooks." On p. 6–8 a good picture of the development of visibility measurements is given. The principal instruments for visibility measurements are briefly described. (Same items as *MAB* 2.5–28, May 1951.) *Subject Headings:* **1. Meteorological instruments 2. Visibility meters.**

3I–248 551.591.31/32(42)

*Davis, Norman Ernest, **Fog at London Airport.** *Meteorological Magazine*, London, 80(943):9–14, Jan. **1951.** 2 figs., table, ref. **DLC**—The hourly and monthly mean data of visibility for 4 years at London airport are presented. The frequency of vision range for distances less than 220, 440, 880 and 1100 yards and relation between visibility and brightness, weather condition and smoke are discussed. (Same as *MAB* 2.6–144, June 1951.) *Subject Headings:* **1. Diurnal visibility variations 2. Annual visibility variations 3. London, England.**

3I–249 551.591

de Boer, J. B. and Vermeulen, D., **On measuring the visibility with motorcar headlighting.** *Applied Scientific Research*, The Hague, B2(1):1–32, **1951.** 21 refs., 2 tables, 6 refs. **DWB**—A special comparative investigation on visibility by motor-car headlights with American and European types of equipment. Numerous observations give interesting experimental characteristics of conditions of night visibility and physiological properties of the human eye. The influence of glare on visibility also was investigated with measurement of illumination (in luxes) of the observer's eyes. The results of experiments (containing numerous graphs) are important for meteorologists studying the problem of night visibility. *Subject Headings:* **1. Night visibility 2. Physiological factors in visibility 3. Traffic safety.**

3I–250 551.591.6:551.578.45(71)

Fleming, M. R., **Preliminary report on investigation of vertical visibilities in snow.** *Canada. Meteorological Div., Cir.* 1962, June 8, **1951.** 6 p. graphs, refs., equations. **DWB**—Based on data obtained at Moncton Airport, tables and nomograms are worked out to enable observer or pilot to estimate vertical visibility more accurately from the horizontal and slant visibility. Sources of error in eye, pilot balloon, pilot report on ceiling observation are discussed. Vertical visibility in snow is always less than horizontal—author believes this to be due to the manner snow flakes are oriented during their fall. (Same as *MAB* 3.7–203, July 1952.) *Subject Headings:* **1. Vertical visibility 2. Slant visibility 3. Visibility in snow 4. Moncton, Canada.**—*M.R.*

3I–251 551.591:551.508.92

Foitzik, Leonhard (*Lindenberg*), **Sichtbeobachtung-Sichtmessung.** [Visibility observation and measurement.] *Zeitschrift für Meteorologie*, 5(1):1–14, Jan. **1951.** 4 figs., 5 tables, 24 refs. **MH-BH**—Describes an experiment in determining visibility by day to an accuracy of at least 10% using about 50 objects classified into 8 sectors, 10 logarithmic intervals of distance, and 5 degrees of visibility. Visibility in km is given by (distance of object) × (visibility factor). Selection of objects during 2 hours after sunset is examined (moonlit, moonless, cloudy). The meaning of visibility is considered with reference to 4 types of visibility meter but the use of natural objects is considered preferable except for very limited horizons. At night, photometry of lights is preferred. For continuous day and night work author advocates light-transmission apparatus over a few hundred meters. He gives examples of autographic 24-hour records on 4 selected days. (Same as *MAB* 2.5–191, May 1951.) *Subject Headings:* **1. Visibility measurements 2. Visibility meters.**—*C.E.P.B.*

3I–252 551.591.3:551.576.4:656.7(45)

Landi, A. and Giallombardo, C., **La determinazione della visibilitá e della altezza della base delle nubi sugli aeroporti.** [Determination of the visibility and the height of the base of clouds over airports.] *Rivista di Meteorologia Aeronautica*, 11(2):13–18, Roma, April–June **1951.** 2 figs. Italian, French, English and German summaries, p. 13. **MH-BH**—Methods used in Italy for official measurements of ceiling height and visibility at airports are reviewed. The cloud height is determined by estimation or by ceiling or pilot balloons in the daytime, and is measured with a projector at night. The effect of ragged bases during nimbus is discussed. Day and night visibilities are defined, choice of visibility marks and lights discussed and IMO (1949 code) specifications set forth. *Subject Headings:* **1. Ceiling heights 2. Visibility measurement 3. Aeronautical meteorological services 4. Italian Meteorological Service 5. Italy.**—*M.R.*

3I–253 551.506.2:551.576.4:551.591.36:551.553.6(595)

*Malaya. Meteorological Service, **Frequency tables (low cloud, visibility, sunshine) and anemogram analysis, 1950.** Singapore, **1951.** 46 p. entirely tables. **DWB**—Observations of cloud base (ceiling) height, and visibility 3 times a day for 17 stations are tabulated for each month

according to frequency within various standard limits. Duration of sunshine, wind speed and maximum wind are also tabulated for each month for the same stations. No annual summary appears in this publication. (See *MAB* 3.1–31 and 3.1–37, Jan. 1952.) *Subject Headings:* **1. Aeronautical climatology 2. Ceiling heights 3. Visibility data 4. Wind frequencies 5. Sunshine duration 6. Malaya. I. Lea, C. A.** (*Dir.*).—*M.R.*

3I–254 551.591.1 551.508.92

†Neuberger, Hans. **Introduction to physical meteorology.** State College, Pennsylvania, **1951.** 266 p. figs., tables, refs., equations. **DWB**—In Chap. 2, entitled "Visibility in meteorology" (p. 31–70, 17 figs., 25 refs., equations), the author gives a complete review of the visibility problem in its present state. The dependence of visibility on psychophysical and physiological factors, brightness variations under different conditions, effect of contrast, etc. are analyzed. Much attention is paid to objective measurements of visual range and to principles on which the most popular visibility meters were constructed. Under consideration also are the conditions of night visibility and its measurement. Same as *MAB* 3.4–8, April 1952.) *Subject Headings:* **1. Physics of visibility 2. Physiological factors in visibility 3. Visibility meters 4. Night visibility 5. Textbooks.**

3I–255 551.574.1 551.591.1

Ogiwara, Sekiji and Ôkita, Toshiichi. **The size distribution of sea-salt nuclei and its contribution to visibility.** *Tohoku. University, Science Reports, 5th Ser., Geophysics,* 3(2):78–86, Sept. **1951.** 10 figs., 2 tables, 14 refs., equations. **DWB**—Observations made on Pacific coast of northern Honshu. New formula which relates visibility to atmospheric relative humidity is obtained. *Subject Headings:* **1. Condensation nuclei 2. Saline nuclei 3. Visibility.**—*A.A.*

3I–256 551.591

Pearson, C. A., Koomen, M. J. and Tousey, R., **Visual measurements of atmopsheric transmission of light at night.** *U. S. Naval Research Laboratory, Report* No. 3810, Feb. 23, **1951.** 13 p. 8 figs., 3 tables, 8 refs. **DWB**—The transparency of the atmosphere at night in the visible range of the spectrum, was measured on 120 nights over a 9 mile course across Chesapeake Bay by using a series of calibrated light sources ½ to 1 mile apart. Effects of elevation also investigated. Night observations agreed fairly well with those before sunset and after dawn. Equipment described and illustrated, precision of measurements 2% for normal values. No apparent correlation between transmission values and relative humidity, pressure, temperature, wind speed or direction. (Same as *MAB* 2.9–166, Sept. 1951.) *Subject Headings:* **1. Visibility measurement 2. Atmospheric transparency 3. Chesapeake Bay.**—*M.R.*

3I–257 551.591.1:551.575(44)

*Tassëel, R. (*Le Bourget Airdrome, Paris*), **Sur la visibilité des sources lumineuses de balisage.** [On the visibility of boundary lights.] *Journal Scientifique de la Météorologie,* 3(9/11):16–25, 77–85, Jan.–March/July–Sept., **1951.** 6 figs., 5 tables, 1 ref., 22 equations. **DWB**—In the first paper (see *MAB* 2.9–167, Sept. 1951) the physics of visibility is discussed and application to point sources of light developed theoretically. The relation between visibility of boundary lights or beacons and actual meteorological visibility is worked out by Koschmieder formula. Experimental data obtained during the winter of 1950–51 are analyzed and given in tables and on scatter diagrams, and the accuracy of observations clearly indicated. Both point sources and non-point sources are tested, and the coefficients established for each. The variation of brightness and contrast in fog as a function of the attenuation is also shown. *Subject Headings:* **1. Visibility of lights 2. Fog 3. Le Bourget Airdrome, France.**—*M.R.*

3I–258 551.591.2(52)

Yamamoto, Gi-ichi and Miura, Akira. **Opacity at Sendai.** *Meteorological Society of Japan, Journal, 2nd Ser.,* 29.1.:1–13, Jan. **1951.** 12 figs., 3 tables, 14 refs., 8 equations. In Japanese, English summary p. 12–13. Also in: *Tohoku. University, Science Reports, 5th Ser., Geophysics,* 3(1):23–33, April, **1951.** In English. **MH-BH**—From variation of opacity with relative humidity, concentration of sulfuric acid and sea salt is estimated. Visibility is compared with lapse rate of temperature (opacity in stable air due to increase in size as well as number of nuclei). Decrease of opacity with increasing wind velocity verified. Variations with wind direction and season also studied. (Same as *MAB* 3.3–239, Mar. 1952.) *Subject Headings:* **1. Visibility 2. Japan.**—*C.E.P.B.*

3I–259 551.591:551.575.5:551.521.3(44)

Yannacopoulos, P., **Interprétation de l'obscurcissement du 13 février 1951, à Paris.** [Interpretation of the darkness of Feb. 13, 1951 in Paris.] *La Météorologie,* 4th Ser., No. 24:267–270, Oct./Dec. **1951.** table. **DWB**—Intense darkness occurred in France on Feb. 13, 1951. It passed

the zenith at Montsouris, Paris at 0907h, coming from SSE, and proceeding to NNW. The meteorological conditions attending this phenomenon are reviewed and a tentative explanation of the dense fog (visibility 100 m) and the darkness offered. *Subject Headings:* **1. Daylight obscuration 2. Poor visibility 3. Fog 4. Paris, France.**—*M.R.*

1952

3I–260 551.591.1

Best, A. C., **Condensation nuclei and the development of radiation fog.** *Great Britain. Meteorological Research Committee, Meteorological Research Paper*, No. 698. S.E. III/118, 31 Jan. **1952.** 16 p. fig., 5 tables, 7 refs., 39 equations. Mimeographed. **DWB**—The paper traces the effect of condensation of hygroscopic nuclei (sea salt) on visibility as humidity increases. Opacity (extinction coefficient) is discussed as a function of drop size and the latter as a function of mass of nucleus and relative humidity. With assumed distributions of nucleus size, opacity and liquid water are calculated for humidities 80, 99.9, 100%. Assuming all nuclei of same size, equations are solved for growth of droplets and decrease of visibility in cooling air after saturation; visibility is found to depend on water content, total salt content and size of nuclei. (Same as *MAB* 3.5–275, May 1952.) *Subject Headings:* **1. Fog formation 2. Visibility 3. Radiation fog 4. Saline nuclei.**—*C.E.P.B.*

3I–261 551.591

Diurnal and seasonal variation of visibility. *Meteorological Magazine*, London, 81(960):174–185. **June 1952.** 11 refs. **DWB**—A discussion opened by L. Sugden and H. L. Wright on conditions over British airports, including smoke pollution, and the contributions to the extinction coefficient by gas molecules, liquid nuclei and solid particles. A long discussion followed. *Subject Heading:* **1. Visibility.**—*C.E.P.B.*

3I–262 551.575:551.588.6

Gold, Ernest, **Fog in a wood.** *Weather*, 7(3):96, March **1952.** **DWB**—Note on lower visibility in a wood than in open during fog. *Subject Headings:* **1. Fog 2. Visibility in forests 3. Forest influences.**

3I–263 551.591.31(261)

Jameson, H., **A marked diurnal variations of visibility at sea.** *Marine Observer*, 22(156):82–84. April **1952.** 2 figs. **DWB**—Diurnal variation of fog, mist and haze in square 5–10°N, 25–30°W from ships' observations, shows in Dec.–May marked maximum from 16–16h. This may be due to absorption of radiation by sand carried by NE trade wind, causing an inversion and concentration of sand near the sea. In June–Nov. winds are variable and effect disappears. (Same as *MAB* 3.7–201, July 1952.) *Subject Headings:* **1. Visibility at sea 2. Diurnal visibility variations 3. North Atlantic Ocean.**—*C.E.P.B.*

3I–264 551.591:551.555.8(61)

Johnston, D. W., **Relation of visibility to wind in Cyrenaica.** *Meteorological Magazine*, London, 81(955):8–11, Jan. **1952.** fig. **DWB**—Discusses reasons (stable air, little loose sand) why strong south winds in northern Cyrenaica on April 1–2, 1951, gave good visibility. (Same as *MAB* 3.5–274, May 1952.) *Subject Headings:* **1. Visibility 2. Cyrenaica, Libya.**—*C.E.P.B.*

3I–265 551.591.35:551.510.42

Krebs, H. D. and Doebe, W., **Extreme Fälle der Sichtverschlechterung in Neubiberg durch Stadtdunst von München.** [Extreme cases of decrease of visibility in Neubiberg because of town haze from Munich.] *Meteorologische Rundschau*, 5(1–2):12–14, Jan.–Feb. **1952.** 5 figs., 6 refs. **MH-BH**—In anticyclonic conditions, wind at Neubiberg, 9 km SSE of Bogenhausen (Munich), may change from S to N and in 10–15 min visibility falls from over 10 to under 3 miles. This is associated with an excess of temperature Neubiberg–Munich of about 1.4°C and the development of thermal circulation which brings Munich smoke over Neubiberg. (Same as *MAB* 3.7–202, July 1952.) *Subject Headings:* **1. Visibility 2. Urban influences 3. Visibility in haze 4. Munich, Germany.**—*C.E.P.B.*

3I–266 551.591.361

Paetzold, Hans-Karl, **Zwei Fälle von extremer Luftklarheit in Weissenau/Württ.** [Two cases of extremely clear air in Weissenau (Württemberg).] *Meteorologische Rundschau*, 5(3/4):56–57, March/April **1952.** table, 6 refs. **DWB**—On June 14 and July 10, 1951, stars showed extinction only at zenith distances 86–88.6°. On both nights cold fronts with showers alternated with maritime tropical air. *Subject Headings:* **1. Anomalous transparency 2. Extinction 3. Air mass effects.**—*C.E.P.B.*

3I–267 551.591.3(262)(45)

*Polli, Silvio (*Ist. Talassografico, Trieste*), **Andamento diurno, stagionale ed annuo della visibilità nel Golfo di Trieste.** [Diurnal, seasonal and annual visibility variations in the Gulf of Trieste.] *Geofisica Pura e Applicata*, 21:63–70, **1952.** 2 figs., 4 tables, refs. Italian and English summaries p. 63. **MH-BH**—The fixed points which are used in estimating visibility toward the sea from the terrace of the Oceanographic Institute of Trieste are enumerated (650 m to 28.8 km). Results of these thrice daily observations (1931–50) are analyzed and tabulated in various ways. Unusual visibility (>100 km) is not rare. Observations made according to the IMO code are converted into meters to be comparable with land observations. The best visibility occurs in summer and at midday. Considerable year to year variation is noted. *Subject Headings:* **1. Visibility variations 2. Visibility at sea 3. Trieste 4. Italy.**—*M.R.*

3I–268 551.591.3(26)

Rouch, Jules Alfred Pierre (*Dir. Musee Oceanog., Monaco*). **Mesure de la visibilité au dessus de la mer.** [Visibility measurement at sea.] *Geofisica Pura e Applicata*, 21:41–42, **1952.** equation. English summary p. 41. **MH-BH**—Measuring the distance to the clearly visible horizon at sea provides a good means of estimating visibility which itself is an indicator of air–sea temperature spread, air mass characteristics, frontal patterns, turbulence, etc. *Subject Headings:* **1. Visibility measurement 2. Visibility at sea 3. Air–sea temperature difference 4. Marine meteorology.**—*M.P.K.*

3I–269 551.591:016

†Weiner, Jack and Leikind, Morris C. (*comp.*), **Visibility: a bibliography.** The Library of Congress, Tech. Info. Div., July **1952.** 68 p. 2008 refs. **DLC**—This comprehensive bibliography, prepared over a period of 4 years, contains material arranged under the following major headings: I. Visual detection factors in the laboratory; II. Physical factors affecting visibility in the field; III. Actual observations in various parts of the world; IV. Engineering (including meteorological, military and naval) applications of visibility. There is an author, but not a subject index. *Subject Headings:* **1. Visibility bibliographies 2. Bibliographies. I. U. S. Library of Congress. Tech. Info. Div. II. Gibson, Jack R.** (*ed.*).

SUPPLEMENTARY MATERIAL

3I–270 551.593.54(748)

*Neuberger, Hans Hermann, **Studies in atmospheric turbidity in central Pennsylvania.** *Pennsylvania State College, Bulletin*, 34(58), Nov. **1940.** 36 p. 17 figs., 17 tables, 29 refs. Pennsylvania. State College Studies, No. 9. **DLC**—Data obtained in measurements of Arago's point, of solar intensity and of sky blue at Pennsylvania State College from 1938 to 1940 are presented in tables and graphs and commented on. Theory and techniques of measurement are discussed in detail. Data include values of turbidity and of its variation. The author concludes that the observation of the position of Arago's point at 10° solar elevation provides sufficient information on atmospheric turbidity under normal conditions. *Subject Headings:* **1. Turbidity measurement techniques 2. Turbidity data 3. Arago's point 4. State College, Penna.**—*G.T.*

3I–271 551.593

Hulburt, Edward Olson, **Optics of atmospheric haze.** *Optical Society of America, Journal*, 31(7):467–476, July **1941.** 5 figs., 3 tables, refs., 23 equations. **DWB**—By means of a telescopic photometer, measurements were made in daylight of b, the brightness of a large approximately black body at a distance $d = 3.2$ km, and of h, the brightness of the sky just above the black body. For visual ranges v from 3.2 to 15 km the measurements agreed with the theoretical relations $v = (1/\beta) \log 1/\eta$ and $\beta = (1/d) \log (1/(1 - b/h)$ where β is the atmospheric attenuation coefficient, and η is the threshold of brightness contrast, being 0.02 for the usual intensities of daylight illumination. It followed that the ratio of β to the attenuation of optically pure air was 227, 55.4, 27.7, 13.8, 5.54 and 2.77 for v 1, 5, 10, 20, 50 and 100 km, respectively. The angular distribution of light scattered by haze was determined in two ways: 1) by measuring the brightness at various angles of a searchlight beam at night, and 2) by measuring the brightness of the horizon sky at various azimuths for a moderately low sun and a cloudless sky. The distribution was much the same for haze ranging from thin to thick. It showed pronounced forward scattering, over three-fourths of the light being scattered in a forward direction and less than one-fourth in a backward direction. Such a scattering distribution would occur from haze particles of various sizes, most of them being of dimensions greater than the wave-length of white light. *Subject Headings:* **1. Haze 2. Scattering of light.**—*Author's abstract.*

3I–272 551.5:725.39

*†Durst, C. S., **Meteorology of airfields.** London, H. M. Stationery Office, **1949.** 87 p. 30 figs., 42 tables, 17 refs., 4 append. Great Britain Meteorological Office, M.O. 507. **DWB**—Physical factors influencing frequency of occurrence of visibility, cloud, precipitation, wind, pressure and temperature as affecting airport sites. Data and conclusions useful in planning airports and alternates. Emphasis on fog formation. "Flying Fitness" figures compounded for visibility, ceiling, etc. Suggests application elsewhere. P. 66–78 contain tables of average number of days with poor visibility at two standard observation hours, at over 100 station airports in all parts of the earth (arranged by continents). (Same as *MAB* 3–8, March 1950.) *Subject Heading:* **1. Visibility data.**—*M.R.*

3I–273 551.591.3:628.9

Walther, Friedrich, **Sicht und Beleuchtung während der Dämmerung.** [Visibility and illumination during twilight.] *Austria. Zentralanstalt für Meteorologie und Geodynamik, Jahrbuch*, v. 87, Anhang 9:D76–D82, **1950.** fig. **DWB**—Civil twilight is taken to begin or when sun is 6° below horizon, but actual time depends on meteorological conditions (cloud, fog, haze), moonlight, distance of horizon, existence of artificial lights, speed and direction of movement of subject and personal factor, contrast, etc. Author investigated time of lighting up of traffic and rooms (4 step scale) and shows annual variation of each scale graphically, with an auxiliary cloud scale and some examples of use of scale. (Same as *MAB* 3.7–200, July **1952.**) *Subject Headings:* **1. Illumination 2. Visibility.**—*C.E.P.B.*

3I–274 551.501.42:551.521.3

Averkiev, M. S., **Ob opredelenii osnovnykh kharakteristik prozrachnosti atmosfery.** [On the determination of the basic characteristics of atmospheric transparency.] *Glavnoe Upravlenie Gidrometeorologicheskoĭ Sluzhby, Informatsionnyĭ Sbornik*, Leningrad, 1:55–64, **1951.** 3 tables, 12 refs., 8 equations. **DLC**—A brief review of the formula for computing the coefficient of air transparency and turbidity factor is given and the methods of reduction of transparency characteristics are criticized. The author suggests that we accept as a suitable and demonstrable index the atmospheric transparency reduced to masses of 2 atmospheres, taking into account the fact that for that height of the sun the direct measurements are also possible. A table for reduction is given and suggestion is made to the Central Geophysical Observatory to undertake a detailed computation of the table offered by the author and also the table of S. I. Sivkov which wa spublished in *Trudy GGO*, 14(76), **1949.** *Subject Headings:* **1. Actinometry 2. Atmospheric transparency 3. Turbidity.**

3I–275 551.591.1

Middleton, W. E. Knowles, **Visibility in meteorology.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 91–97. 2 figs., 57 refs., 12 equations.) **MH-BH**—After a brief review of the physics of scattering of light on particles of various sizes, the author considers the formulae (based on Koschmieder) which permit calculation of luminance and (according to Duntley) optical slant range and then the theory of contrast threshold. Physiological factors which affect day and night observation by the unaided eye, the calculation of visual range (day and night), instruments for measuring visual range, reporting visibility in practice are considered. Finally, the author's recommendations for future study of physiological factors, creation of new instruments for general use in visibility observation and the need for a practical and accurate method of measuring transparency of the atmosphere as a function of height are considered. *Subject Headings:* **1. Visibility measurement 2. Visual range 3. Atmospheric transparency.**—*M.R.*

3I–276 551.591(98)

*Rae, R. W. (*Canada, Met. Div.*), **Climate of the Canadian Arctic Archipelago.** Toronto, **1951.** 90 p. 15 figs., tables, 20 refs. **DWB**—Chap. VI (p. 27–31) on "Visibility" deals with fog, blowing snow and precipitation which are the main restrictions to visibility in the Canadian Arctic. Average visibility (days/mo) data for 15 stations will be found on p. 75 and 76. The longest period of record is for 10 years (8 stations). *Subject Headings:* **1. Visibility restrictions 2. Visibility data 3. Canadian Arctic. I. Canada. Meteorological Div.**—*M.L.R.*

3I–277 551.591.1:551.574.1:551.576.1

aufm Kampe, Hans Joachim and Weickmann, Helmut K., **Trabert's formula and the determination of the water content in clouds.** *Journal of Meteorology*, 9(3):167–171, June **1952.** 3 figs., 11 refs., 5 equations. **DWB**—In Trabert's formula $V = Cr/W$ relating visibility V m in clouds to water content W gm/m³ and droplet radius $r\mu$, C is found empirically as about 6. Theoretically the formula is $2.6\Sigma(n_i r_i^3)/W\Sigma(n_i r_i^2)$. The discrepancy is shown to be due to the range of r in some clouds from 2–100μ. From aircraft observations it is found that if the droplet spectrum is narrow (fair weather Cu) $V = 2.6r/W$ nearly; with a wide spectrum C is larger. *Subject Headings:* **1. Visibility 2. Water content of clouds.**—*C.E.P.B.*

3I–278 551.501.1:551.591

Bouman, M. A. and Blockhuis, E. W. M. (*Utrecht Natl. Defence Res. Council of the Netherlands*), **The visibility of black objects against an illuminated background.** *Optical Society of America, Journal*, 42(8):252–258, Aug. **1952.** 5 figs., 7 refs. **DWB**—Experiments were made to quantitatively determine the chance for perception of negative flashes of various durations, shapes and sizes. The results are in agreement with traditional contrast threshold data for positive flashes. The total number of quanta intercepted by a circular negative flash, and by rectangular flashes as a function of the root of the area in square minutes of arc for various flashtimes for a 60% chance of observation are shown in a series of graphs and discussed. *Subject Headings:* **1. Contrast threshold 2. Visibility of lights.**—*M.R.*

3I–279 551.591.32:551.575.3(262)

§El Fandy, M. Gamal Eldin (*Prof. Met., Farouk I Univ., Alexandria, Egypt*), **Visibility in the eastern Mediterranean.** *Geofisica Pura e Applicata*, 21:58–62, **1952.** 4 figs., refs. **MH-BH**—Seasonal synoptic conditions in the eastern Mediterranean are first reviewed, then air flow types are analyzed according to incidence of fog in that area. Frequency of haze and fog at sea are discussed, radiation fog (summer) being the most common type, occurring during SE flow. Dust and optical haze are also prevalent in summer, especially near mid-day. Inversions accompany etesien winds and are responsible for morning stratus, whereas khamsins produce dust and haze restrictions to visibility. *Subject Headings:* **1. Visibility at sea 2. Fog frequencies 3. Radiation fog 4. Haze 5. Dust 6. Khamsin 7. Eastern Mediterranean.**—*M.R.*

3I–280 551.591 551.593.55

Middleton, W. E. Knowles and Mauo, Eleanor G. (*Natl. Res. Council of Canada, Ottawa, Canada*), **The appearance of colors in twilight.** *Optical Society of America, Journal*, 42(2):116–121, Feb., **1952.** 12 figs. **DWB**—Sixty-four colors well-distributed near the Munsell 6-plane were viewed as 2° squares surrounded by a 5° black square which was in turn surrounded by a large area of Munsell N6/. The colors were viewed in random order at luminances of −3.34, −2.86, −2.37, −1.38, and 0.88 log candles/m^2, the illumination being at a color temperature of about 6500°K. The observer was required to signal by means of a switch whether he observed red, orange, yellow, green, blue, purple, or grey. No time limit was imposed. Sixteen sets of observations were made by each of two observers, eight sets by a third observer. All had normal color vision. At the lowest luminance only occasional observations of purple were reported, nearly all normal colors appearing grey. As the luminance was raised, purple appeared first, then blue. The colors along an axis from about 7.5GY to 2.5P required the greatest illumination to appear chromatic. These results show an interesting correspondence with those of MIDDLETON and HOLMES on the appearance of colors subtending small angles. *Subject Headings:* **1. Twilight phenomena 2. Color visibility.**—*Author's abstract.*

3I–281 551.591.31:535.34

Pearson, C. A., Koomen, M. J. and Tousey, R. (*Naval Res. Lab., Wash., D. C.*), **Visual measurements of atmospheric transmission of light at night.** *American Meteorological Society, Bulletin*, 33(3):117–121, March **1952.** 7 figs., 6 refs., 3 equations. **MH-BH**—Measurements of the visual transmission at night when the weather was clear were made across Chesapeake Bay by means of Maxwellian-view telephotometers. Illumination produced by standardized light sources over a distance of about nine miles was measured and transmission values of 0.92 to 0.4 per sea mile were obtained and these corresponded to daylight visual averages of 4 to 10 sea miles respectively with an accuracy of ±2%. No correlation was found between atmospheric transmission and the individual meteorological variables. The telephotometer is illustrated with diagrams and a photograph, its construction and calibration of the light sources are described and the results of measurements are presented graphically. (See 3I–256 above.) *Subject Headings:* **1. Night visibility 2. Transmission of light 3. Telephotometers 4. Chesapeake Bay.**—*I.L.D.*

PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The contents of periodicals included in this section are for information only, and will not be listed in the monthly indexes until abstracted. When material is furnished in advance of date of publication, the pagination may be omitted.

American Geophysical Union, Transactions, Volume 33, Number 4, August 1952.

Herman, Rénee, Herman, Louis and Hepner, Georges: **Processes of emission of the molecular and atomic spectra of nitrogen observed in the light of the polar aurora,** p. 489–494.
Huff, F. A. and Stout, G. E.: **Area-depth studies for thunderstorm rainfall in Illinois,** p. 495–499.
Crary, A. P. and Ewing, Maurice: **On a barometric disturbance recorded on a vertical long-period seismograph,** p. 499–501.
White, Robert M. and Cooley, Duane S.: **The large-scale vertical eddy stress on the free atmosphere,** p. 502–506.
Middleton, W. E. Knowles and Mungall, A. G.: **On the psychophysical basis of meteorological estimates of "visibility,"** p. 507–512.
O'Brien, Morrough P.: **Salinity currents in Estuaries,** p. 520–530.
Richards, L. A. and Moore, D. C.: **Influence of capillary conductivity and depth of wetting on moisture retention in soil,** p. 531–540.
Bay, Clyde E., Wunnecke, George W. and Hays, Orville E.: **Frost penetration into soils as influences by depth of snow, vegetative cover, and air temperatures,** p. 541–546.
Bliss, E. S. and Johnson, C. E.: **Some factors involved in ground-water replenishment,** p. 547–548.
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